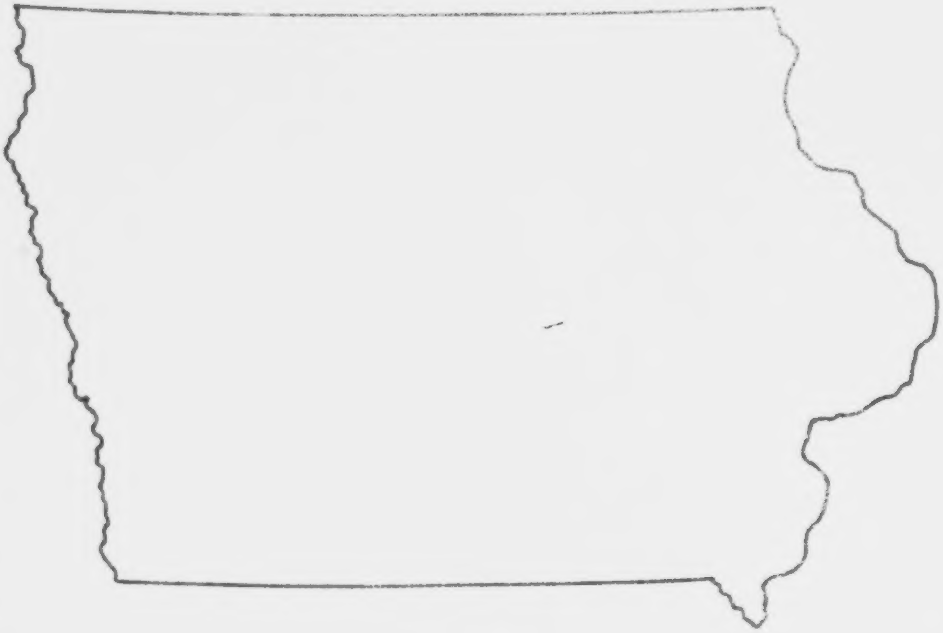
DEPARTMENT OF THE INTERIOR
March 3, 1849

Water Resources Data
Iowa
Water Year 1989



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT IA-89-1
Prepared in cooperation with the Iowa Department of Natural Resources (Geological Survey-Bureau), Iowa Department of Transportation and with Federal agencies

CALENDAR FOR WATER YEAR 1989

1988

OCTOBER

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SEPTEMBER

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17	18	19	20	21	22	23
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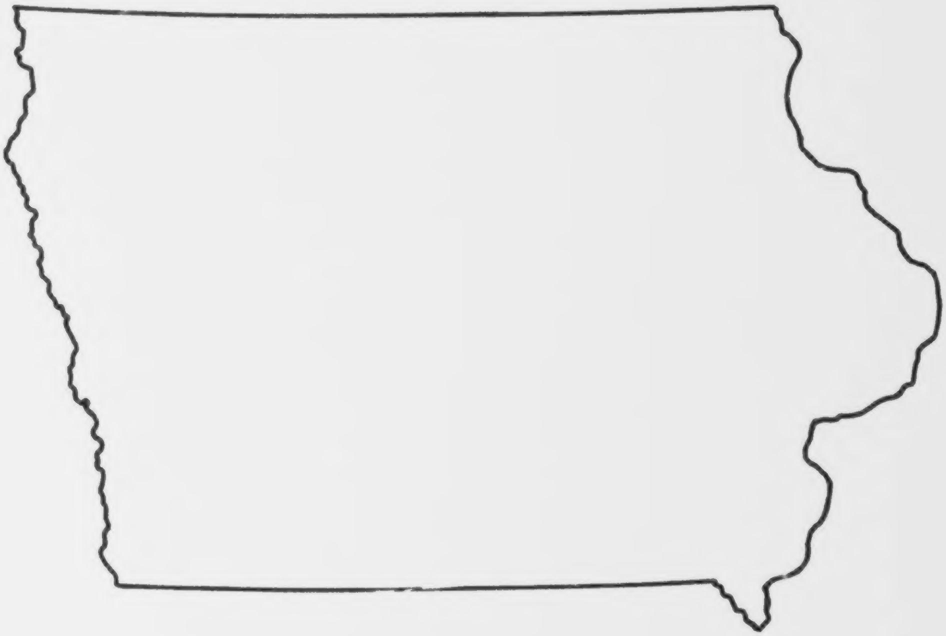
DEPARTMENT OF THE INTERIOR
March 3 1849

Water Resources Data
Iowa
Water Year 1989

by D.J. O'Connell, M.J. Liszewski, R.B. Lambert, and W.J. Matthes



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT IA-89-1
Prepared in cooperation with the Iowa Department of Natural Resources (Geological Survey Bureau), Iowa Department of Transportation and with Federal agencies

DEPARTMENT OF THE INTERIOR

MANUEL LUJAN, JR., Secretary

U.S. GEOLOGICAL SURVEY

Dallas L. Peck, Director

For information on the water program in Iowa write to:

District Chief, Water Resources Division
U.S. Geological Survey
P.O. Box 1230
Iowa City, Iowa 52244

1989

PREFACE

This report of Iowa is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface-water and ground-water data-collection networks in each State, Puerto Rico and, the Trust Territories. These records of streamflow, ground-water levels, and quality of water provide the hydrologic information needed by State, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. The authors had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines. Most of the data were collected, computed, and processed from area field offices. Personnel in charge of the field offices are:

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16. Abstract (Limit: 200 words)

Water resources data for the 1989 water year for Iowa consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; ground water levels and water quality of ground-water wells. This report contains records of water discharge for 117 stream-gaging stations; stage or contents for 8 lakes and reservoirs; water quality for 6 stream-gaging stations; sediment records for 10 stream-gaging stations; water levels for 185 observation wells; and chemical analyses for the 135 municipal wells. Also included are 113 crest-stage partial-record stations. Additional water data were collected at various sites, not part of of the systematic data-collection program, and are published as miscellaneous discharge measurements and miscellaneous water-quality analyses.

17. Document Analysis a. Descriptors

*Iowa, *Hydrologic data, *Surface water, *Ground water, *Water quality, Flow rates, Streamflow, Stream-gaging stations, Lakes, Reservoirs, Chemical analyses, Sediment, Water, Temperature, Sampling sites, Water levels, Water analyses, Data collections, Ground water levels.

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CONTENTS

Page

Preface iii
List of gaging stations, in downstream order, for which records are published ix
List of ground water wells, by county, for which records are published xiii
Introduction 1
Cooperation 2
Summary of hydrologic conditions 3
  Precipitation and surface water 3
  Suspended sediment 7
  Surface water-quality 12
  Ground water 17
  Ground water-quality 21
Special networks and programs 26
Explanation of the records 27
  Station identification numbers 27
    Downstream order system 27
    Latitude-longitude system 30
    Numbering system for wells 31
  Records of stage and water discharge 32
    Data collection and computation 32
    Data presentation 34
    Identifying estimated daily discharge 36
    Accuracy of the records 36
    Other records available 37
  Records of surface-water quality 37
    Classification of records 37
    Arrangement of records 38
    On-site measurements and sample collection 38
    Water temperature and specific conductance 39
    Sediment 39
    Laboratory measurements 40
    Data Presentation 40
    Remark Codes 42
  Records of ground-water levels 43
    Data collection and computation 43
    Data presentation 43
  Records of ground-water quality 45
    Data Presentation 45
    Explanation of descriptive headings 46
Access to WATSTORE data 47
Definition of terms 48
Publications on Techniques of Water-Resources Investigations 57
Discontinued gaging stations 59
Discontinued water-quality stations 60
Station records, surface water 61
  Discharge at partial-record stations and miscellaneous sites 234

Page
Crest-stage partial-record stations........................ 234
Special study and miscellaneous sites........................ 242
Miscellaneous water-quality data........................ 247
Station records, ground water........................ 263
Ground-water level records........................ 263
Ground-water-quality data........................ 354
Precipitation water-quality data........................ 393
Index........................ 397

ILLUSTRATIONS

Page

Figure 1. Map of precipitation record in the National Weather Service's designated climatological districts for water year 1989 4

Figure 2. Graph showing daily mean discharge for water year 1989 compared with monthly median discharges for water years 1951-80 for three index stations 8

Figure 3. Graph showing a comparison of total annual sediment discharge for water year 1989 with average annual sediment discharge and the lowest annual sediment discharge for period of record, for the five long term daily sediment stations in Iowa 10

Figure 4. Map showing location of active and discontinued water-quality stations 11

Figure 5. Graph showing comparison of dissolved-solids and nitrate concentration for water year 1989 with historical data summarized by monthly box plots at the NASQAN station on the Iowa River at Wapello 14

Figure 6. Graph showing comparison of dissolved-solids and nitrate concentration for water year 1989 with historical data summarized by monthly box plots at the NASQAN station on the Skunk River at Augusta 15

Figure 7. Graph showing comparison of dissolved-solids and nitrate concentration for water year 1989 with historical data summarized by monthly box plots at the NASQAN station on the Nishnabotna River above Hamburg 16

Figure 8. Map showing location of recording and nonrecording observation wells 18

Figure 9. Graph showing monthly water levels during water year 1989 compared to the average monthly level for the period of record 19

Figure 10. Map showing location of wells where water samples were collected during water year 1989 24

ILLUSTRATIONS--Continued

Figure 11. Map showing location of active, continuous-record gaging stations.......... 28

Figure 12. Map showing location of active crest-stage gaging stations... 29

Figure 13. Latitude-longitude well number.......... 30

Figure 14. Local well-numbering system for well 96-20-3CDBD1.......... 31

TABLES

Page

Table 1. Monthly and annual precipitation during water year 1989 as a percentage of normal precipatation (1951-80).......... 3

Table 2. Minimum discharge for water year 1989 compared with the 7-day, 2-year low flow discharge; the 7-day, 10 year low flow discharge; and the minimum discharge for period of record for gaging stations on unregulated streams in Iowa with more than 20 years of record.......... 9

Table 3. Historical low water levels measured during water year 1989 in wells completed into unconsolidated aquifers.......... 20

Table 4. Historical low water levels measured during water year 1989 in wells completed in bedrock aquifers.......... 22

GAGING STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED

[Letter after station name designates type of data: (d) discharge, (c) chemical, (m) microbiological, (t) water temperature, (s) sediment]

Page

UPPER MISSISSIPPI RIVER BASIN
Mississippi River:
UPPER IOWA RIVER BASIN

Upper Iowa River near Dorchester (d) ... 61
Mississippi River at McGregor (dcts) ... 62

TURKEY RIVER BASIN

Turkey River at Spillville (d) ... 66

Roberts Creek:
Silver Creek:

Silver Creek near Luana (d) ... 67
Unnamed Creek near Luana (d) ... 68
Roberts Creek above Saint Olaf (d) ... 69
Turkey River at Garber (d) ... 70

MAQUOKETA RIVER BASIN
Maquoketa River:

North Fork Maquoketa River at Fulton (d) ... 71
Maquoketa River near Maquoketa (d) ... 72
Mississippi River at Clinton (d) ... 73

WAPSIPINICON RIVER BASIN

Wapsipinicon River near Elma (d) ... 74
Wapsipinicon River at Independence (d) ... 75
Wapsipinicon River near De Witt (d) ... 76

CROW CREEK BASIN

Crow Creek at Bettendorf (d) ... 77

IOWA RIVER BASIN
Iowa River:

East Branch Iowa River near Klemme (d) ... 78
Iowa River near Rowan (d) ... 79
Iowa River at Marshalltown (dcts) ... 80
Timber Creek near Marshalltown (d) ... 86
Richland Creek near Haven (d) ... 87
Salt Creek near Elberon (d) ... 88
Walnut Creek near Hartwick (d) ... 89
Big Bear Creek at Ladora (d) ... 90
Iowa River at Marengo (d) ... 91
Coralville Lake near Coralville ... 92

Iowa River:

Rapid Creek near Iowa City (d) ... 93
Clear Creek near Coralville (d) ... 94
Iowa River at Iowa City (d) ... 95
South Branch Ralston Creek at Iowa City (d) ... 96
Old Mans Creek near Iowa City (d) ... 97
English River at Kalona (d) ... 98
Iowa River near Lone Tree (d) ... 99
Cedar River at Charles City (d) ... 100
Little Cedar River near Ionia (d) ... 101

Page

UPPER MISSISSIPPI RIVER BASIN--Continued

IOWA RIVER BASIN--Continued

Cedar River at Janesville (d) 102
West Fork Cedar River at Finchford (d) 103
Winnebago River at Mason City (d) 104
Willow Creek:
Clear Creek:
Clear Lake at Clear Lake 105
Cedar River:
Shell Rock River at Shell Rock (d) 106
Beaver Creek at New Hartford (d) 107
Cedar River at Cedar Falls (c) 108
Black Hawk Creek at Hudson (d) 110
Cedar River at Waterloo (d) 111
Cedar River at Cedar Rapids (d) 112
Cedar River near Conesville (d) 113
Iowa River at Wapello (dcts) 114

SKUNK RIVER BASIN

South Skunk River (head of Skunk River) near Ames (d) 120
Squaw Creek at Ames (d) 121
South Skunk River at Colfax (dcts) 122
Indian Creek near Mingo (d) 126
South Skunk River near Oskaloosa (d) 127
North Skunk River near Sigourney (d) 128
Cedar Creek near Oakland Mills (d) 129
Skunk River at Augusta (dcts) 130
Mississippi River at Keokuk (d) 136

DES MOINES RIVER BASIN

Des Moines River at Estherville (d) 137
Des Moines River at Humboldt (d) 138
East Fork Des Moines River at Dakota City (d) 139
Des Moines River at Fort Dodge (d) 140
Boone River near Webster City (d) 141
Des Moines River near Stratford (d) 142
Saylorville Lake near Saylorville 143
Des Moines River near Saylorville (dcts) 144
Beaver Creek near Grimes (d) 148
North Raccoon River (head of Raccoon River):
North Raccoon River near Newell (d) 149
Cedar Creek:
Big Cedar Creek near Varina (d) 150
North Raccoon River near Sac City (d) 151
Indian Creek:
Wall Lake outlet:
Black Hawk Lake at Lake View 152

Page

UPPER MISSISSIPPI RIVER BASIN--Continued
DES MOINES RIVER BASIN--Continued

North Raccoon River near Jefferson (d)........................ 153
Hardin Creek:
East Fork Hardin Creek near Churdan (d)............ 154
South Raccoon River:
Middle Raccoon River near Bayard (d)............... 155
Lake Panorama at Panora............................ 156
Middle Raccoon River at Panora (d)................. 157
South Raccoon River at Redfield (d).................... 158
Raccoon River at Van Meter (dc).......................... 159
Walnut Creek at Des Moines (d)......................... 162
Des Moines River below Raccoon River at Des Moines (d)............ 163
Fourmile Creek at Des Moines (d)......................... 164
North River near Norwalk (d)............................. 165
Middle River near Indianola (d).......................... 166
South River near Ackworth (d)............................ 167
Des Moines River near Runnells(d).......................... 168
White Breast Creek near Dallas (d)....................... 169
Lake Red Rock near Pella 170
English Creek near Knoxville (d)......................... 171
Des Moines River near Tracy (d)............................ 172
Cedar Creek near Bussey (d).............................. 173
Des Moines River at Ottumwa (d)............................ 174
Des Moines River at Keosauqua (d).......................... 175
MISSOURI RIVER BASIN
Missouri River:
BIG SIOUX RIVER BASIN
Big Sioux River:
Rock River near Rock Valley (d).......................... 176
Big Sioux River at Akron (d)............................... 177
Missouri River at Sioux City (ds)............................ 178
PERRY CREEK BASIN
Perry Creek at 38th Street, Sioux City (d)................. 183
FLOYD RIVER BASIN
Floyd River at Alton (d)................................... 184
West Branch Floyd River near Struble (d)................. 185
Floyd River at James (d)................................... 186
Missouri River at Decatur, Nebraska (d)...................... 187
MONONA-HARRISON DITCH BASIN
West Fork ditch (head of Monana-Harrison ditch) at Hornick (d)..... 188
Monona-Harrison ditch near Turin (d)....................... 189
LITTLE SIOUX RIVER BASIN
Little Sioux River:
Milford Creek:
West Okoboji Lake at Lakeside Laboratory near Milford.... 190
Ocheyedan River near Spencer (d)......................... 191
Little Sioux River at Linn Grove (d)....................... 192
Little Sioux River at Correctionville (d).................. 193
Maple River at Mapleton (d).............................. 194
Little Sioux River near Turin (d).......................... 195
SOLDIER RIVER BASIN
Soldier River at Pisgah (d)................................ 196

Page

MISSOURI RIVER BASIN--Continued
    BOYER RIVER BASIN
    Boyer River at Logan (d).. 197
Missouri River at Omaha, Nebraska (ds).............................. 198
Missouri River at Nebraska City, Nebraska (ds)...................... 203
    NISHNABOTNA RIVER BASIN
    West Nishnabotna River at Hancock (d)........................... 208
    West Nishnabotna River at Randolph (d).......................... 209
        East Nishnabotna River near Atlantic (d).................... 210
        East Nishnabotna River at Red Oak (d)....................... 211
    Nishnabotna River above Hamburg (dcts).......................... 212
    TARKIO RIVER BASIN
    Tarkio River at Stanton (d)..................................... 215
Missouri River at Rulo, Nebraska (d)................................ 216
    NODAWAY RIVER BASIN
    Nodaway River at Clarinda (dcts)................................ 217
    PLATTE RIVER BASIN (Iowa-Missouri)
    Platte River near Diagonal (d).................................. 222
        One Hundred and Two River:
        East Fork One Hundred and Two River near Bedford (d)......... 223
    GRAND RIVER BASIN
    Grand River:
        Thompson River:
            Elk Creek near Decatur City (dcts)...................... 224
        Thompson River at Davis City (d)............................ 227
            Weldon River near Leon (d).............................. 228
    CHARITON RIVER BASIN
    Chariton River near Chariton (d)................................ 229
        South Fork Chariton River near Promise City (d)............. 230
    Rathbun Lake near Rathbun 231
    Chariton River near Rathbun (d)................................. 232
    Chariton River near Moulton (d)................................. 233

Page

AUDUBON COUNTY

Well 413044094565601 Local number 78-36-35 ADCC1................ 263
Well 413958094544501 Local number 79-35-10 CABB1................ 263
Well 413843094541701 Local number 79-35-15 DCDD1................ 264
Well 415023094593801 Local number 81-36-12 CBCA1................ 264

BENTON COUNTY

Well 415211092164101 Local number 82-12-31 DAAD1................ 265
Well 415211092164102 Local number 82-12-31 DAAD2................ 265
Well 420459091500201 Local number 84-09-13 DADD1................ 266
Well 420319091540102 Local number 84-09-28 DBCC2................ 266
Well 420731092083801 Local number 85-11-33 CCBC1................ 267
Well 420731092083803 Local number 85-11-33 CCBC3................ 267
Well 421326091522701 Local number 86-09-34 AAAD1................ 268

BUENA VISTA COUNTY

Well 423618095194511 Local number 90-38-16 DDDD11............... 268
Well 424023095571401 Local number 91-35-26 BCCC1................ 269
Well 425233094545001 Local number 93-35-13 ADAA1................ 269

CARROLL COUNTY

Well 420705094394501 Local number 84-33-02 BDBA1................ 270
Well 420643094403701 Local number 84-33-01 CADA1................ 270
Well 420233094475901 Local number 83-35-34 BCDC1................ 271
Well 420335094521501 Local number 84-35-25 BDAD1................ 271
Well 421058094582701 Local number 85-35-07 CCCC1................ 272

CASS COUNTY

Well 411117095091902 Local number 74-37-30 BBBB2................ 272

CERRO GORDO COUNTY

Well 430757093131801 Local number 96-20-17 DAAD1................ 273
Well 430806093164501 Local number 96-21-13 BCCB1................ 273
Well 430658093281001 Local number 96-22-20 CADC1................ 274
Well 431123093124301 Local number 97-20-28 CAAC1................ 274

CHEROKEE COUNTY

Well 423833095365701 Local number 90-40-06 BDCD1................ 275
Well 424348095231601 Local number 91-39-01 ADAD1................ 275
Well 424348095231602 Local number 91-39-01 ADAD2................ 276
Well 424132095480211 Local number 91-42-16 DDDD11............... 276
Well 424802095331201 Local number 92-40-10 BDDD1................ 277
Well 424459095322411 Local number 92-40-26 CCDD1................ 277

CLAYTON COUNTY

Well 424023091291201 Local number 91-05-30 BBBB1................ 278
Well 424057091320001 Local number 91-06-22 ACAC1................ 278
Well 430156091182901 Local number 95-04-22 BCBD1................ 279
Well 425940091194701 Local number 95-04-32 DDDD1................ 279

CRAWFORD COUNTY

Well 415514095312001 Local number 82-40-17 AABB1................ 280
Well 415512095313801 Local number 82-40-17 ABBC1................ 280
Well 420608095111701 Local number 84-37-08 BCCB1................ 281
Well 421106095125501 Local number 85-38-12 DCBA1................ 281
Well 421031095225601 Local number 85-39-16 ADDD1................ 282
Well 421031095225602 Local number 85-39-16 ADDD2................ 282
Well 421005095342801 Local number 85-41-13 CCCC1................ 283

Page

DELAWARE COUNTY

Well 422029091144302 Local number 87-03-18 CBCD2............... 283

DES MOINES COUNTY

Well 404844091142701 Local number 69-03-06 AABA1............... 284
Well 404753091142501 Local number 69-03-06 DDCD1............... 284

EMMET COUNTY

Well 432927094345501 Local number 100-32-11 DDDD1............... 285

GREENE COUNTY

Well 415449094161501 Local number 82-29-18 CAAA1............... 285
Well 415448094163401 Local number 82-29-18 CBAA1............... 286
Well 415449094155601 Local number 82-29-18 DBAA1............... 286
Well 415449094173201 Local number 82-30-13 CABA1............... 287
Well 415608094260701 Local number 82-31-10 AAAA1............... 287
Well 420149094344701 Local number 83-32-04 ACCC1............... 288
Well 420116094363001 Local number 83-32-08 BBBC1............... 288
Well 420507094141901 Local number 84-29-16 CBAB1............... 289
Well 420603094355101 Local number 84-32-08 ACDB1............... 289
Well 420723094143201 Local number 85-29-32 DDDD1............... 290

GRUNDY COUNTY

Well 422605092560001 Local number 88-18-15 DBBB1............... 290

GUTHRIE COUNTY

Well 413223094150801 Local number 78-30-24 CAAB1............... 291
Well 413248094314301 Local number 78-32-21 AAAA1............... 291
Well 413837094194601 Local number 79-30-22 BAAC1............... 292
Well 414110094260501 Local number 79-31-23 BBBB1............... 292
Well 414514094381601 Local number 80-33-12 ACCC1............... 293
Well 414821094271301 Local number 81-31-22 CCCC1............... 293
Well 414652094293301 Local number 81-31-31 CBCC1............... 294
Well 414728094385301 Local number 81-33-26 DDDD1............... 294
Well 414728094392401 Local number 81-33-35 ABBC1............... 295

HARRISON COUNTY

Well 413024095353901 Local number 78-41-31 DDDD1............ ... 295
Well 413523095483101 Local number 78-45-05 ACDD1............... 296
Well 413524095490601 Local number 78-43-05 BCDD1............... 296
Well 413838095462001 Local number 79-42-19 AADB1............... 297
Well 413836095465502 Local number 79-42-19 BADC2............... 297
Well 414226095435002 Local number 80-42-27 CCBA2............... 298
Well 414228095442301 Local number 80-42-28 DBCD1............... 298
Well 414213095431602 Local number 80-42-34 ABBB2............... 299
Well 414149095422401 Local number 80-42-35 BDCC1............... 299
Well 415124095361501 Local number 81-41-03 ACCC1............... 300
Well 415109095363201 Local number 81-41-03 CDBB1............... 300
Well 415003095382301 Local number 81-41-17 ABAA1............... 301
Well 414702095395101 Local number 81-41-31 BDDD1............... 301
Well 414700095373001 Local number 81-41-33 CAAA1............... 302
Well 415148095545001 Local number 81-44-01 ABAB1............... 302
Well 414955096000601 Local number 81-44-18 AADA1............... 303

HENRY COUNTY

Well 405741091334501 Local number 71-06-09 CBCA1............... 303
Well 405810091330502 Local number 71-06-09 ABAC2............... 304
Well 410852091394301 Local number 73-07-09 AABD1............... 304

Page

HUMBOLDT COUNTY

Well 424039094103601 Local number 91-28-20 CAAA1................ 305

IDA COUNTY

Well 422215095390811 Local number 87-41-05 CCCC11............... 305
Well 423107095383201 Local number 89-41-13 CCCC1................ 306

IOWA COUNTY

Well 414709091515801 Local number 81-09-35 BCAA1................ 306
Well 414930092093801 Local number 81-11-17 CBBC1................ 307
Well 414816092053401 Local number 81-11-23 DCCC1................ 307
Well 415125092164201 Local number 81-12-06 ADDA1................ 308

JACKSON COUNTY

Well 420842090165701 Local number 85-6E-29 ACAD1................ 308
Well 420842090165703 Local number 85-6E-29 ACAD3................ 309
Well 420842090165704 Local number 85-6E-29 ACAD4................ 309

JASPER COUNTY

Well 414210092592001 Local number 80-18-31 ABBB1................ 310
Well 414147093035401 Local number 80-19-33 ACAC1................ 310

JOHNSON COUNTY

Well 414107091322901 Local number 79-06-04 AAAA1................ 311
Well 413940091344701 Local number 79-06-07 DAAC1................ 311
Well 413925091324001 Local number 79-06-09 DDBC1................ 312
Well 413955091320303 Local number 79-06-10 BDBC3................ 312
Well 413844091323201 Local number 79-06-16 DDAD1................ 313
Well 414458091260201 Local number 80-05-09 DBBC1................ 313
Well 414315091252001 Local number 80-05-22 CBCB1................ 314
Well 414315091252002 Local number 80-05-22 CBCB2................ 314
Well 414149091331501 Local number 80-06-33 BDBB1................ 315
Well 414853091425101 Local number 81-07-19 BCBB1................ 315
Well 415052091483801 Local number 81-08-05 CCCD1................ 316

JONES COUNTY

Well 415808091160501 Local number 83-04-25 CBBB1................ 316

LEE COUNTY

Well 403630091240801 Local number 67-05-14 BAAD1................ 317

LINN COUNTY

Well 415534091251502 Local number 82-05-10 CBAA2................ 317
Well 415556091313001 Local number 82-06-10 AABB1................ 318
Well 415442091343001 Local number 82-06-17 CBAB1................ 318
Well 415422091422601 Local number 82-07-18 CDCD1................ 319
Well 415343091360101 Local number 82-07-25 AAAB1................ 319
Well 415509091461801 Local number 82-08-20 ACBB1................ 320
Well 415834091351601 Local number 83-06-30 ABBA1................ 320
Well 415816091393401 Local number 83-07-28 ADDA1................ 321
Well 415725091410101 Local number 83-07-32 ACDC1................ 321
Well 420126091484801 Local number 83-08-06 DDAD1................ 322
Well 420300091325801 Local number 84-06-33 ABBB1................ 322
Well 420526091370701 Local number 84-07-13 BCBB1................ 323
Well 420508091395811 Local number 84-07-16 DBBB1................ 323
Well 420338091431601 Local number 84-08-25 ACAD1................ 324
Well 420320091472201 Local number 84-08-28 CBDD1................ 324
Well 421149091403301 Local number 85-07-04 CCCC1................ 325
Well 420954091480801 Local number 85-08-20 ABCD1................ 325

Page
Well 420730091490401 Local number 85-08-31 DDCD1................ 326

LYON COUNTY

Well 431812096302701 Local number 98-48-16 DDAD1................ 326
Well 432140095595301 Local number 99-44-26 DDDD1................ 327
Well 432553096105701 Local number 99-45-05 ABAC1................ 327
Well 432601096335511 Local number 100-48-31 CCCC11............... 328

MADISON COUNTY

Well 411727093483001 Local number 75-26-23 AAAC1................ 328

MARION COUNTY

Well 411323093142601 Local number 74-21-11 DBCC1................ 329
Well 411329093142902 Local number 74-21-11 DBBB2................ 329
Well 411328093143503 Local number 74-21-11 CAAD3................ 330

MARSHALL COUNTY

Well 420355092534701 Local number 84-18-24 CDCA1................ 330

MONONA COUNTY

Well 415456095414101 Local number 82-42-14 ADCA1................ 331
Well 420004095451501 Local number 83-42-17 ACDD1................ 331
Well 420139095155701 Local number 83-43-04 CBCB1................ 332
Well 420730095510701 Local number 84-43-04 ABAA1................ 332
Well 420406095543301 Local number 84-44-24 DCAD1................ 333
Well 421018095582001 Local number 85-44-16 CDAA1................ 333
Well 421006095580301 Local number 85-44-16 DCDD1................ 334
Well 421018095591301 Local number 85-44-17 DCAA1................ 334

MONTGOMERY COUNTY

Well 410057095075101 Local number 72-37-29 BABA1................ 335

MUSCATINE COUNTY

Well 412120091080401 Local number 76-02-30 CBAA1................ 335

O'BRIEN COUNTY

Well 425610095250611 Local number 94-39-26 BADB11............... 336
Well 425808095480311 Local number 94-42-09 DDDD11............... 336
Well 430930095350401 Local number 96-40-05 DDDA1................ 337

OSCEOLA COUNTY

Well 431620095250501 Local number 98-39-26 CDAD1................ 337
Well 431620095250511 Local number 98-39-26 CDAD11............... 338
Well 431613095251801 Local number 98-39-26 CDCC1................ 338
Well 431620095482402 Local number 98-42-33 AABB2................ 338
Well 432828095283611 Local number 100-39-17 DCCB11.............. 339

PAGE COUNTY

Well 404257095150801 Local number 68-38-07 CCAA1................ 339

PLYMOUTH COUNTY

Well 424850096074801 Local number 92-45-02 CBCB1................ 340
Well 424833096324701 Local number 92-48-06 DDDA1................ 340
Well 425249096125001 Local number 93-46-12 DDDD1................ 340

POTTAWATTAMIE COUNTY

Well 411024095095502 Local number 74-38-36 BAAA2................ 341
Well 411359095171901 Local number 74-39-01 CCCC1................ 341
Well 411246095502001 Local number 74-43-18 BCCC1................ 342

SAC COUNTY

Well 422500095084801 Local number 88-37-22 CCCC1................ 342
Well 422850095171501 Local number 89-38-36 CBCC1................ 343

Page

SCOTT COUNTY

Well 413544090212901 Local number 78-5E-3 AADA1................ 343

SHELBY COUNTY

Well 413255095070401 Local number 78-37-17 DDDD1................ 344
Well 413442095193101 Local number 78-39-10 BBBA1................ 344
Well 413359095182701 Local number 78-39-11 CCBC1................ 345
Well 413031095204901 Local number 78-39-32 DDAA1................ 345
Well 414624095252301 Local number 80-39-06 AADC1................ 346
Well 414856095160101 Local number 81-38-21 ADAD1................ 346

SIOUX COUNTY

Well 430140095573101 Local number 95-43-07 AAAA1................ 347
Well 430913096033201 Local number 96-44-08 ADAA1................ 347

STORY COUNTY

Well 420137093361501 Local number 83-24-02 DBAD1................ 347

WASHINGTON COUNTY

Well 411300091320701 Local number 74-06-15 BDAC1................ 348
Well 411244091323501 Local number 74-06-15 CBDD1................ 348
Well 421829091304701 Local number 75-06-14 ABBB1................ 349
Well 412037091564701 Local number 76-09-31 CBBC1................ 349
Well 412750091495201 Local number 77-09-24 AADA1................ 350

WEBSTER COUNTY

Well 421550094041001 Local number 86-28-14 ADAB1................ 350
Well 421837094083601 Local number 87-28-29 CCCD1................ 351
Well 423018094214701 Local number 89-30-23 CCBB1................ 351

WOODBURY COUNTY

Well 422058095573701 Local number 87-44-15 CBBB1................ 352
Well 422830096000511 Local number 88-44-06 BAAB11.............. 352
Well 423015096034601 Local number 89-44-20 DCDC1................ 353
Well 422910096135811 Local number 89-46-36 BBDC11.............. 353

INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Iowa each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside of the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Iowa."

This report contains records for water discharge at 117 gaging stations, stage or contents for 8 lakes and reservoirs, water quality records for 6 gaging stations, sediment records for 10 gaging stations, and water levels for 185 observation wells. Also included are data for 113 crest-stage partial-record stations and water-quality data from 135 municipal wells. Additional water data were collected at various sites not involved in the systematic data-collection program and are published as miscellaneous measurements and analyses. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State, local, and Federal agencies in Iowa.

Records of discharge and stage of streams, and contents or stage of lakes and reservoirs were first published in a series of U.S. Geological Survey water-supply papers entitled, "Surface Water Supply of the United States." Through September 30, 1960, these water-supply papers were in an annual series and then in a 5-year series for 1961-65 and 1966-70. Records of chemical quality, water temperatures, and suspended sediment were published from 1941 to 1970 in an annual series of water-supply papers entitled, "Quality of Surface Waters of the United States." Records of ground-water levels were published from 1935 to 1974 in a series of water-supply papers entitled, "Ground-Water Levels in the United States." Water-supply papers may be consulted in the libraries of the principal cities in the United States or may be purchased from Branch of Distribution, U.S. Geological Survey, 604 South Pickett Street, Alexandria, Virginia, 22304.

For water years 1961 through 1970, streamflow data were released by the Geological Survey in annual reports on a State-boundary basis. Water-quality records for water years 1964 through 1970 were similarly released either in separate reports of in conjunction with streamflow records.

Beginning with the 1971 water year, water data for streamflow, water quality, and ground water are published in official Survey reports on a State-boundary basis. These official Survey reports carry an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this report is identified as "U.S. Geological Survey Water-Data Report IA-89-1." These water-data reports are for sale, in paper copy or in microfiche, by the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephone, (319) 337-4191.

COOPERATION

The U.S. Geological Survey and organizations in the State of Iowa have had cooperative agreements for the systematic collection of streamflow records since 1914, for ground water levels since 1935, and for water-quality records since 1943. Organizations that assisted in collecting data through cooperative agreement with the Survey in water year 1989 are:

Iowa Department of Natural Resources (Geological Survey Bureau), Donald L. Koch, Bureau Chief and State Geologist

University of Iowa, Institute of Hydraulic Research, Robert G. Hering, Dean of College of Engineering and John F. Kennedy, Director

University of Iowa, Hygenics Laboratory, W.J. Hausler, Jr., Director

Iowa Department of Transportation, Highway Division, Robert Humphrey, Director, and Vernon J. Marks, Research Engineer

Iowa State University, Richard E. Hasbrook, Contracts and Grants Officer, and Iowa State Water Resources Research Institute, T. Al Austin, Director

City of Cedar Rapids, Donald Canney, Mayor

City of Des Moines, John Dorrian, Mayor

City of Fort Dodge, Micheal D. McCarville, Mayor

Assistance in the form of funds or services was given by the Corps of Engineers, U.S. Army, in collecting flow records for 77 gaging stations. Assistance was also furnished by NOAA-National Weather Service, U.S.Department of Commerce.

The following organizations aided in collecting records:

Union Electric Co; Des Moines Water Works; Waterloo Sewage Treatment Plant; University of Iowa; West Central Iowa Rural Water Association; and cities of, Charles City, Clear Lake, Denison, Iowa City, Marshalltown, Sioux City and Waterloo.

Organizations that supplied data are acknowledged in station descriptions.

SUMMARY OF HYDROLOGIC CONDITIONS

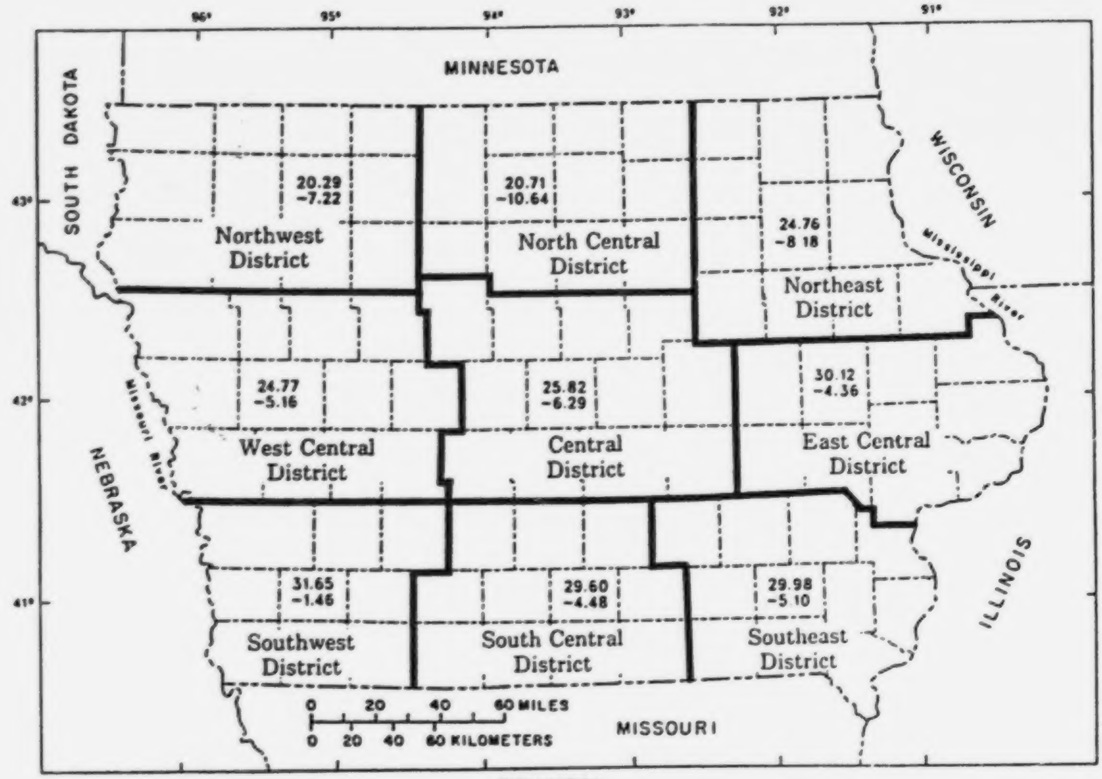
Precipitation and Surface Water

The less-than-normal precipitation and streamflow pattern set during water year 1988 (October 1, 1987, to September 30, 1988) continued into water year 1989 (October 1, 1988, to September 30, 1989). Statewide precipitation for water year 1989 was 26.08 inches or 81 percent of the normal annual statewide precipitation of 32.09 inches during 1951-80 (table 1 and fig. 1). Water year 1989 ranked as the 11th driest on record (1873-1989) (Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, oral and written commun., 1989).

Table 1.--Monthly and annual precipitation during water year 1989 as a percentage of normal precipitation (1951-80). [Source: Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, written commun., 1989]

Climatological District	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
Northwest	15	206	45	80	27	63	78	47	59	112	65	104	74
North Central	21	209	92	67	27	55	81	45	51	74	52	84	66
Northeast	43	164	74	87	44	62	91	57	41	50	95	126	75
West Central	7	207	101	153	44	35	40	61	89	104	61	167	83
Central	27	190	64	135	51	35	60	75	69	80	84	137	80
East Central	73	147	75	82	59	56	84	59	77	74	114	136	87
Southwest	17	151	67	130	83	22	37	41	138	94	98	223	96
South Central	15	151	57	99	78	19	32	114	65	105	119	149	87
Southeast	34	166	71	74	86	36	76	84	90	72	111	123	85
Statewide	29	176	72	99	54	43	65	65	74	84	87	139	81

Statewide average precipitation during October was 0.66 inches or 29 percent of the normal statewide precipitation of 2.30 inches. Precipitation in October ranged from 7 percent of normal in west-central Iowa to 73 percent of normal in east-central Iowa. Most of the precipitation in the State occurred on October 22. Streamflows in the State had been in recession until this time. Some streamflows did recover slightly due to the October 22 rains but then receded so that at the end of the month streamflows were less than at the beginning of the month.


96°
95°
94°
93°
92°
91°
43°
42°
41°
MINNESOTA
SOUTH DAKOTA
WISCONSIN
Mississippi River
Missouri River
NEBRASKA
ILLINOIS
MISSOURI
20.29
-7.22
Northwest District
20.71
-10.64
North Central District
24.76
-8.18
Northeast District
24.77
-5.16
West Central District
25.82
-6.29
Central District
30.12
-4.36
East Central District
31.65
-1.46
Southwest District
29.60
-4.48
South Central District
29.98
-5.10
Southeast District
0 20 40 60 MILES
0 20 40 60 KILOMETERS

EXPLANATION

29.60 PRECIPITATION, IN INCHES, DURING WATER YEAR 1989
-4.48 DEVIATION FROM LONG-TERM AVERAGE (1951-80), IN INCHES

Figure 1.--Precipitation record in the National Weather Service's designated climatological districts for water year 1989. (Source: Harry Hillaker, State Climatologist, Iowa Department of Agriculture and Land Stewardship, written commun, 1989.)

Statewide average precipitation during November was 2.66 inches or 176 percent of normal statewide precipitation. Precipitation in November ranged from 147 percent of normal in east-central Iowa to 209 percent of normal in north-central Iowa. On November 15, rainfall exceeding 1 1/2 inches fell in the northwest and south-central parts of the State. Snow fell in the northern one-half of the State on November 29 and 30. Streamflows generally increased during November 16-27 due to the rainfall on November 15.

Occasional light snow fell during December in the northern one-half of the State and a mixture of precipitation occurred statewide on December 26. Statewide average precipitation was 0.79 inches or 72 percent of the normal statewide precipitation of 1.09 inches for December. Precipitation in December ranged from 45 percent of normal in northwest Iowa to 101 percent of normal in the west-central part of the State. Streamflows were generally affected by ice and decreased through the month.

Above-average temperatures and near-normal amounts of precipitation were recorded in January. Statewide average precipitation for January was 0.91 inches or 99 percent of normal statewide precipitation of 0.92 inches for the month. Precipitation in January ranged from 67 percent of normal in north-central Iowa to 153 percent of normal in west-central Iowa. Most of the precipitation occurred in the form of rain. Rain in the southern one-half and snow in the northern one-half of the State occurred on January 5, 25, and 28. Streamflows increased statewide by the end of the month. Ice affected most streams in the northern part of the State, whereas many streams in the southern part of the State were ice free.

Below-normal temperature and precipitation were recorded in February. It was the coldest February since 1979 with temperatures 9.1 degrees Fahrenheit below average. Statewide average precipitation was 0.55 inches or 54 percent of the normal statewide precipitation of 1.02 inches. Precipitation during February ranged from 27 percent of normal in north-central and northwest Iowa to 86 percent of normal in the southeast part of the State. Streamflows generally decreased during the month and ice covered the streams throughout the State.

March was deficient in precipitation, receiving 0.92 inches of statewide average precipitation or 43 percent of the normal statewide precipitation of 2.15 inches. The period January through March was the fifteenth driest in 116 years of record. Precipitation in March ranged from 19 percent of normal in south-central Iowa to 63 percent of normal in the northwest part of the State. Streamflows were generally highest during March 10-13 due to warming temperatures and snowmelt, but was less than normal for the State. Mississippi River flow increased throughout the month due to snowmelt in Minnesota and Wisconsin.

Statewide average precipitation for April was 2.07 inches or 65 percent of normal statewide precipitation. Precipitation in April ranged from 32 percent of normal in south-central Iowa to 91 percent of normal in the northeast part of the State. Severe thunderstorms and tornadoes occurred on April 22 and 26. Northeast, north-central, east-central, and northeast Iowa received the majority of the precipitation on April 22. The central, south-central, and southwest parts of the State received the most rainfall from the storms on April 26. Streamflows were not significantly affected by the rainfall due to the antecedent dry conditions. By the end of the month, streamflows were same or less than at the beginning of the month.

Statewide average precipitation for May was 2.57 inches or 65 percent of normal statewide precipitation. The period January through May was the seventh driest in the 116 years of record. Precipitation in May ranged from 41 percent of normal in southwest Iowa to 114 percent of normal in the south-central part of the State. Streamflows generally receded from May 1 through May 21. On May 22, severe thunderstorms and tornadoes occurred in north-central, central, and northeast Iowa. Rainfall amounts varied from trace amounts to 2 1/2 inches. On May 26 storms occurred statewide; north-central, central, south-central, and northeast Iowa received most of the precipitation. Streamflows in the areas receiving the most rain responded with moderate to substantial increases in flow. At the end of the month, streamflows of the streams in the eastern one-third of the State were generally lower than earlier in the month but the remainder of the streams in the State had higher flows due to the precipitation that occurred on May 22 and 26.

The statewide average precipitation for June was 3.31 inches or 74 percent of the normal statewide precipitation of 4.48 inches. The January through June period ranked as the seventh driest for the period of record. Precipitation ranged from 41 percent of normal in northeast Iowa to 138 percent of normal in the southwest part of the State. Streamflows in the southwest, west-central, and central parts of the State varied significantly during the month due to isolated storms; rainfall amounts ranged from 1 1/2 to 7 inches. Streams in the remainder of the State generally receded due to the light, scattered showers that occurred during the month.

Statewide average precipitation during July was 3.32 inches or 84 percent of the normal statewide precipitation of 3.95 inches. Precipitation ranged from 50 percent of normal in northeast Iowa to 112 percent of normal in the northwest. Streamflows were steady or declined slightly except for northwest Iowa where part of the Perry Creek basin had a significant increase in flow due to an isolated storm cell that produced about 4 inches of rain on July 17. Streamflow at the index station on the Cedar River at Cedar Rapids set a new low mean monthly discharge of 533 ft^3/s (cubic feet per second). The previous low mean monthly discharge for July at this station (538 ft^3/s) occurred in 1911.

Statewide average precipitation for August was 3.58 inches or 87 percent of the normal statewide precipitation of 4.10 inches. The precipitation ranged from 52 percent of normal in the north-central to 119 percent of normal in south-central Iowa. The period of January through August was the ninth driest on record. Streamflows generally declined slightly during August except for some fluctuations due to isolated rainfall across the State. Storms occurred on August 22 and 23 in southeast Iowa and again on August 25 and 26 in the central part of the State. Southeast Iowa received 2 to 5 inch rains on August 22 and 23 that caused significant increases in streamflows. Storms on August 25 and 26 in central Iowa caused moderate increases in streamflows.

The statewide average precipitation for September was 4.74 inches or 139 percent of the normal statewide precipitation of 3.42 inches. The precipitation ranged from 84 percent of normal in north-central Iowa to 223 percent of normal in southwest Iowa. The period of January through September was the sixteenth driest on record. Significant precipitation occurred in Iowa in early September. As much as 10 inches of rain fell in parts of south-central, southwest, and west-central Iowa and 2 to 5 inches of rain fell in the remainder of the State. Significant increases in streamflows were caused by the early September rainfall except in the northeast and parts of east-central Iowa. A new peak stage for the period of record of 28.27 feet was recorded on September 10 at the index station on the Nishnabotna River above Hamburg. This stage surpassed the previous record peak stage of 28.14 feet set in 1987.

The monthly mean discharge for the index station on the Cedar River at Cedar Rapids (fig. 2) was in the deficient flow range (25-percent quartile of the median of the monthly mean discharges during water years 1951-80 for the specified month) during water year 1989 except for January and March when the mean discharge was in the normal flow range (25- to 75-percent quartile of the median of the monthly mean discharges during water years 1951-80 for the specified month). Streamflow at the index station on the Des Moines River at Fort Dodge was in the deficient flow range during November and from April through September, and in the normal flow range for the remaining months. Streamflow at the index station on the Nishnabotna River above Hamburg was in the deficient flow range during October, December, February, April, May, July, and August, in the excessive flow range (75-percent quartile of the median of the monthly mean discharges during water years 1951-80 for the specified month) during September, and in the normal flow range for the four remaining months. A comparison of the minimum discharge for water year 1989 with the 7-day, 2-year low-flow discharge; the 7-day, 10-year low-flow discharge; and the minimum discharge for the period of record for gaging stations on unregulated streams in Iowa with more than 20 years of record is presented in table 2.

Suspended-Sediment

Less-than-normal streamflows during water year 1989 produced below average suspended-sediment discharge at four of the five long-term daily sediment stations in Iowa (fig. 3). The suspended-sediment discharge was the lowest for the period of record in the Iowa River at Wapello and in the Des Moines River near Saylorville. The annual suspended-sediment discharge in the Skunk River at Augusta and in the Mississippi River at McGregor was the second lowest for the period of record. Streamflow of the Des Moines River near Saylorville is regulated by the Saylorville Reservoir. Minor flow regulation by navigation dams affects the discharge of the Mississippi River at McGregor. Location of the sediment stations and other active and discontinued water-quality stations are shown on figure 4.

The maximum daily suspended-sediment discharge for water year 1989 in the Mississippi River at McGregor, located in the the Northeast Climatological District (fig. 1), was measured on May 17 during a period of receding high flow and was caused by localized rains. The minimum daily suspended-sediment discharge at this station was measured January 9 to 11.

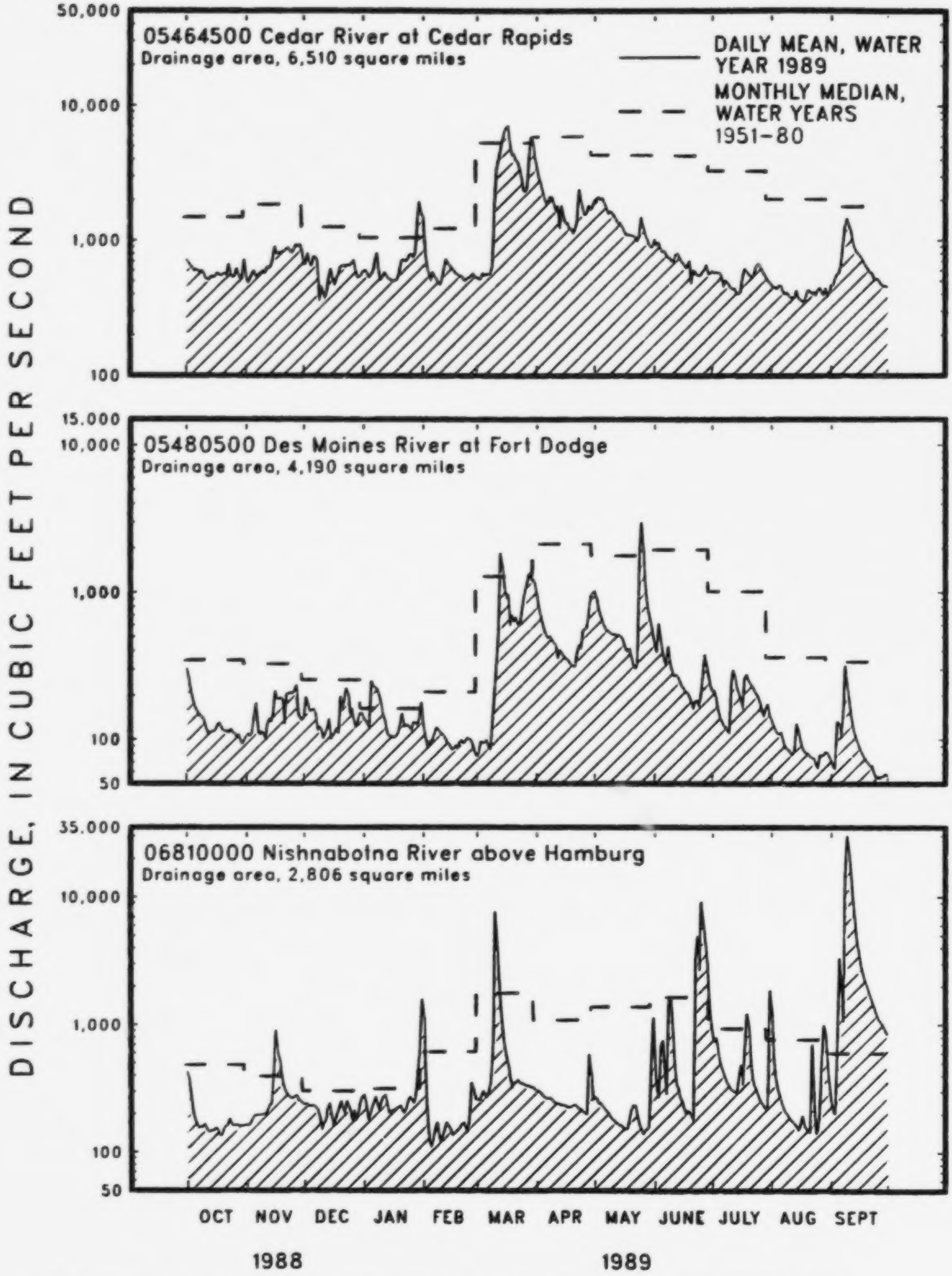


Figure 2.--Daily mean discharge for water year 1989 compared with the monthly median of the monthly mean discharges for water years 1951-80 for three index stations.

Table 2.--Minimum discharge for water year 1989 compared with the 7-day, 2-year low flow discharge; the 7-day, 10-year low flow discharge; and the minimum discharge for period of record for gaging stations on unregulated streams in Iowa with more than 20 years of record. [ft^3/s, cubic feet per second; R, River; Cr, Creek; nr, near]

Station number and name	Minimum discharge for Water Year 1989 (ft^3/s)	Date	7-day, 2-year low-flow[1] (ft^3/s)	7-day, 10-year low-flow[1] (ft^3/s)	Minimum for period of record (ft^3/s)	Water year
05411600 Turkey R at Spillville	6.4	Aug. 18,19	17	7.4	4.4 (2)	1959
05412500 Turkey R at Garber	105	Aug. (5)	161	80	49 (2)	1940
05418500 Maquoketa R nr Maquoketa	199	July 7	287	158	105 (2)	1936
05420560 Wapsipinicon R nr Elma	2.8 (2)	Sept. 19	7.4	4.6	1.9 (2)	1959
05421000 Wapsipinicon R at Independence	17	Aug. (5)	48	17	7.0 (2)	(3)
05422000 Wapsipinicon R nr De Witt	118	(4)	214	103	46 (2)	1977
05449000 East Branch Iowa R nr Klemme	1.3 (2)	Jan. 19,20	3.1	.75	.2 (2)	1959
05449500 Iowa R nr Rowan	7.5	Sept. 29,30	14	5.5	2.9 (2)	1959
05451500 Iowa R nr Marshalltown	31	Sept. 2,3	65	23	4.7 (2)	1977
05451700 Timber Cr nr Marshalltown	.55	Aug. 12	3.7	.40	No flow	(3)
05451900 Richland Cr nr Haven	No flow	July 9,10	1.4	.23	No flow	(3)
05452000 Salt Cr nr Elberon	2.6	July 11	8.7	3.1	.85 (2)	1977
05452200 Walnut Cr nr Hartwick	.34(2)	Aug. 17,18	1.4	No flow	No flow	(3)
05453000 Big Bear Cr at Ladora	.90	Aug. 9,10	5.3	.56	No flow	(3)
05453100 Iowa R at Marengo	74	Aug. 12,13	192	93	24 (2)	1977
05454000 Rapid Cr nr Iowa City	No flow	(4)	.04	No flow	No flow	(3)
05454300 Clear Cr nr Coralville	1.1	Oct. 15,16	2.6	.44	No flow	1977
05455010 South Branch Ralston Cr at Iowa City	No flow	(4)	.04	No flow	No flow	(3)
05455500 English R at Kalona	3.0	(4)	11	2.7	.66 (2)	1977
05457700 Cedar R at Charles City	86	Aug. 22	169	113	60 (2)	(3)
05458000 Little Cedar R nr Ionia	4.9	Aug. 30	18	6.3	3.0 (2)	1959
05458500 Cedar R at Janesville	109	Aug. (5)	136	68	28 (2)	1922
05458900 West Fork Cedar R at Finchford	12 (2)	Sept. (5)	44	14	5.9 (2)	1959
05459500 Winnebago R at Mason City	No flow	Aug. (5)	20	7.1	No flow	1989
05462000 Shell Rock R at Shell Rock	57	Feb. 2	151	69	38 (2)	1977
05463000 Beaver Cr at New Hartford	2.0 (2)	Sept. 30	15	4.9	1.3	1989
05463500 Black Hawk Cr at Hudson	1.3	Apr. 19	14	4.0	.12 (2)	1977
05464000 Cedar R at Waterloo	288	Aug. 18,19	535	278	152 (2)	1959
05470000 South Skunk R nr Ames	.37	Aug. 18,19	2.1	.10	No flow	(3)
05470500 Squaw Cr at Ames	No flow	(4)	2.1	.08	No flow	(3)
05471200 Indian Cr nr Mingo	No flow	Aug. (5)	5.0	.73	No flow	1989
05471500 South Skunk R nr Oskaloosa	12 (2)	Dec. 17	58	10	1.8 (2)	1956
05472500 North Skunk R nr Sigourney	6.7	Oct. 11,18	22	2.1	.1 (2)	1956
05474000 Skunk R at Augusta	35	Dec. 11	135	30	7 (2)	1934
05476500 Des Moines R at Estherville	2.7	Sept. 30	8.7	1.4	No flow	1977
05479000 East Fork Des Moines R at Dakota City	9.7	Sept. 2,3	23	10	4.8 (2)	1977
05481000 Boone R nr Webster City	7.0	Oct. (5)	12	4.3	No flow	1977
05481950 Beaver Cr nr Grimes	.02	Nov. 6	1.8	.07	No flow	(3)
05482170 Big Cedar Cr nr Varina	.11	Sept. 23	.43	No flow	No flow	(3)
05482300 North Raccoon R nr Sac City	7.5	Sept. 1	12	4.5	No flow	1977
05482500 North Raccoon R nr Jefferson	10	Sept. 3	39	8.9	.6 (2)	1956
05483000 East Fork Hardin Cr nr Churdan	No flow	(4)	No flow	No flow	No flow	(3)
05484000 South Raccoon R at Redfield	70	June 21	44	25	17 (2)	1977
05484500 Raccoon River at Van Meter	105	Sept. 3	90	33	10 (2)	1940
05486000 North R nr Norwalk	1.4 (2)	Nov. 25	1.7	No flow	No flow	(3)
05486490 Middle R nr Indianola	2.2	Oct. 30	7.8	1.6	.11 (2)	1977
05487470 South R nr Ackworth	.99(2)	Aug. 18	3.2	.89	No flow	1956
05487980 White Breast Cr nr Dallas	.03(2)	Aug. 13	1.4	.24	.03 (2)	1989
05489000 Cedar Cr nr Bussey	No flow	Aug. 12,13	1.9	.25	No flow	(3)
06483500 Rock R nr Rock Valley	5.4 (2)	Feb. 3	11	1.7	No flow	(3)
06600000 Perry Cr at 38th St, Sioux City	2.0	July (5)	.41	.03	No flow	(3)
06600100 Floyd R at Alton	1.1	Sept. (5)	.52	No flow	No flow	(3)
06600300 West Branch Floyd R nr Struble	3.1	Sept. 26	.16	No flow	No flow	(3)
06600500 Floyd River at James	24	Sept. 30	10	3.2	.90 (2)	1977
06602400 Monona-Harrison Ditch nr Turin	14	Jan. 20	33	16	8.5 (2)	1959
06607500 Little Sioux R nr Turin	88	Aug. 18,19	118	40	17 (2)	1977
06608500 Soldier R at Pisgah	14	July (5)	14	3.9	2.0 (2)	1945
06609500 Boyer R at Logan	15	Sept. 3	29	6.8	1.5 (2)	1938
06807410 West Nishnabotna R at Hancock	30 (2)	Feb. 5	28	6.4	2.2 (2)	1971
06808500 West Nishnabotna R at Randolph	46 (2)	Feb. 5	75	23	10 (2)	1955
05809210 East Nishnabotna R nr Atlantic	12	June 21,22	21	7.4	2.5 (2)	1977
06809500 East Nishnabotna R at Red Oak	34	Dec. 9	35	14	6 (2)	1936
06810000 Nishnabotna R above Hamburg	128	Aug. 24,25	111	26	4.5 (2)	1934
06811840 Tarkio R at Stanton	No flow	Oct. (5)	.50	No flow	No flow	(3)
06817000 Nodaway R at Clarinda	13	Nov. 28	16	5.3	1.0 (2)	(3)
06897950 Elk Cr nr Decatur City	No flow	(4)	.20	No flow	No flow	(3)
06898000 Thompson R at Davis City	.41(2)	Aug. (5)	9.9	1.8	.1 (2)	1956
06898400 Weldon R nr Leon	No flow	(4)	.26	No flow	No flow	(3)
06903400 Chariton R nr Chariton	No flow	(4)	.55	.18	No flow	(3)
06903700 South Fork Chariton R nr Promise City	No flow	(4)	.3	No flow	No flow	(3)

[1] Lara, O.G., 1979, Annual and seasonal low-flow characteristics of Iowa streams, U.S. Geological Survey, Open-File Report 79-555, 506 p.

[2] Minimum daily discharge.

[3] Occurred in more than one year.

[4] Occurred in more than one month.

[5] Occurred more than twice during month.

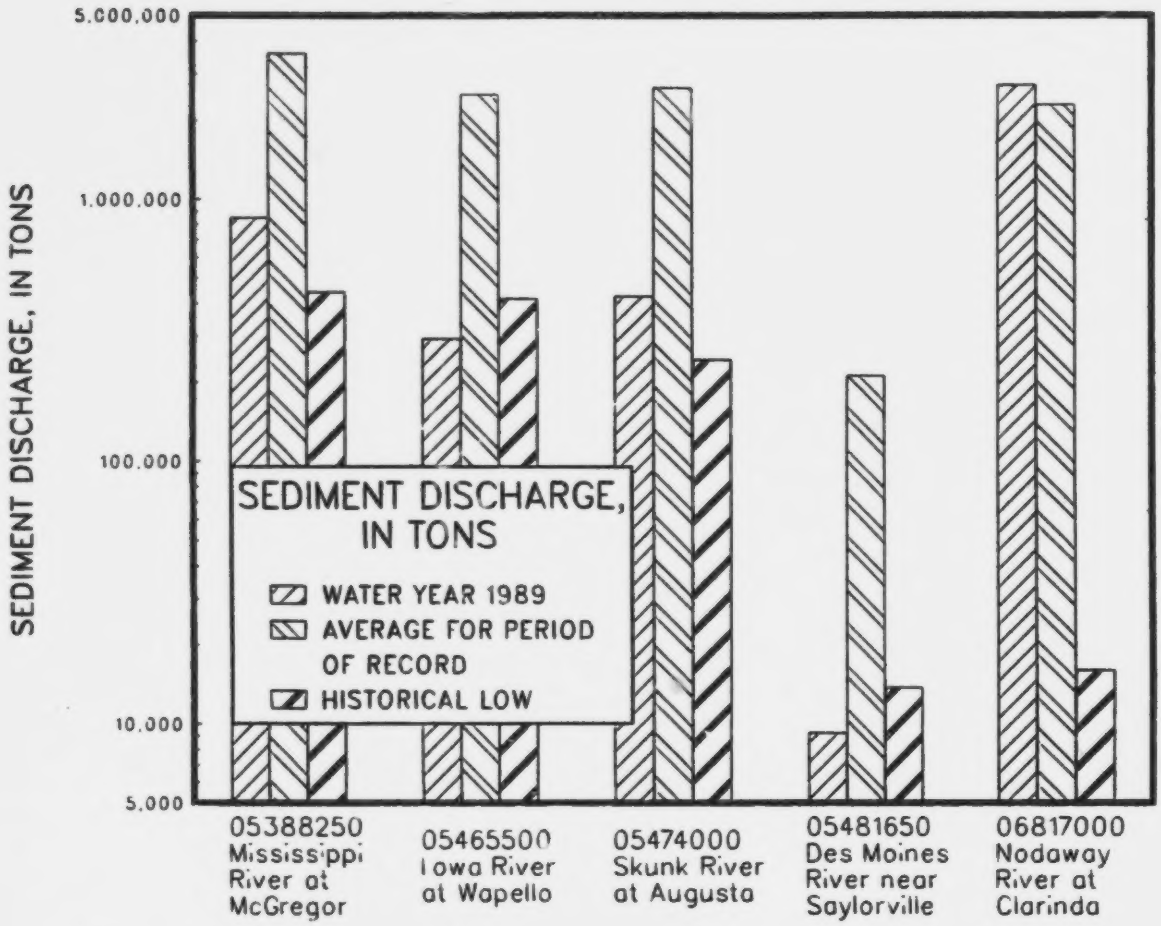


Figure 3.--Comparison of total annual suspended-sediment discharge for water year 1989 with average annual suspended-sediment discharge and the lowest annual sediment discharge for period of record, for the five long term daily sediment stations in Iowa.

The maximum daily suspended-sediment discharge for water year 1989 in the Iowa River at Wapello, located in the Southeast Climatological District, was measured on June 2 and the minimum on February 5. The maximum daily suspended-sediment discharge was due to rainfall that occurred in late May and early June.

The Skunk River at Augusta is located in the Southeast Climatological District. The maximum daily suspended-sediment discharge for water year 1989 was measured on September 10 and the minimum on December 11. The maximum suspended-sediment discharge was the result of rains that occurred September 7 to 10. The rainfall was greatest in the west-central, southwest and south-central parts of the State, but all parts of the State received substantial rainfall during this period.

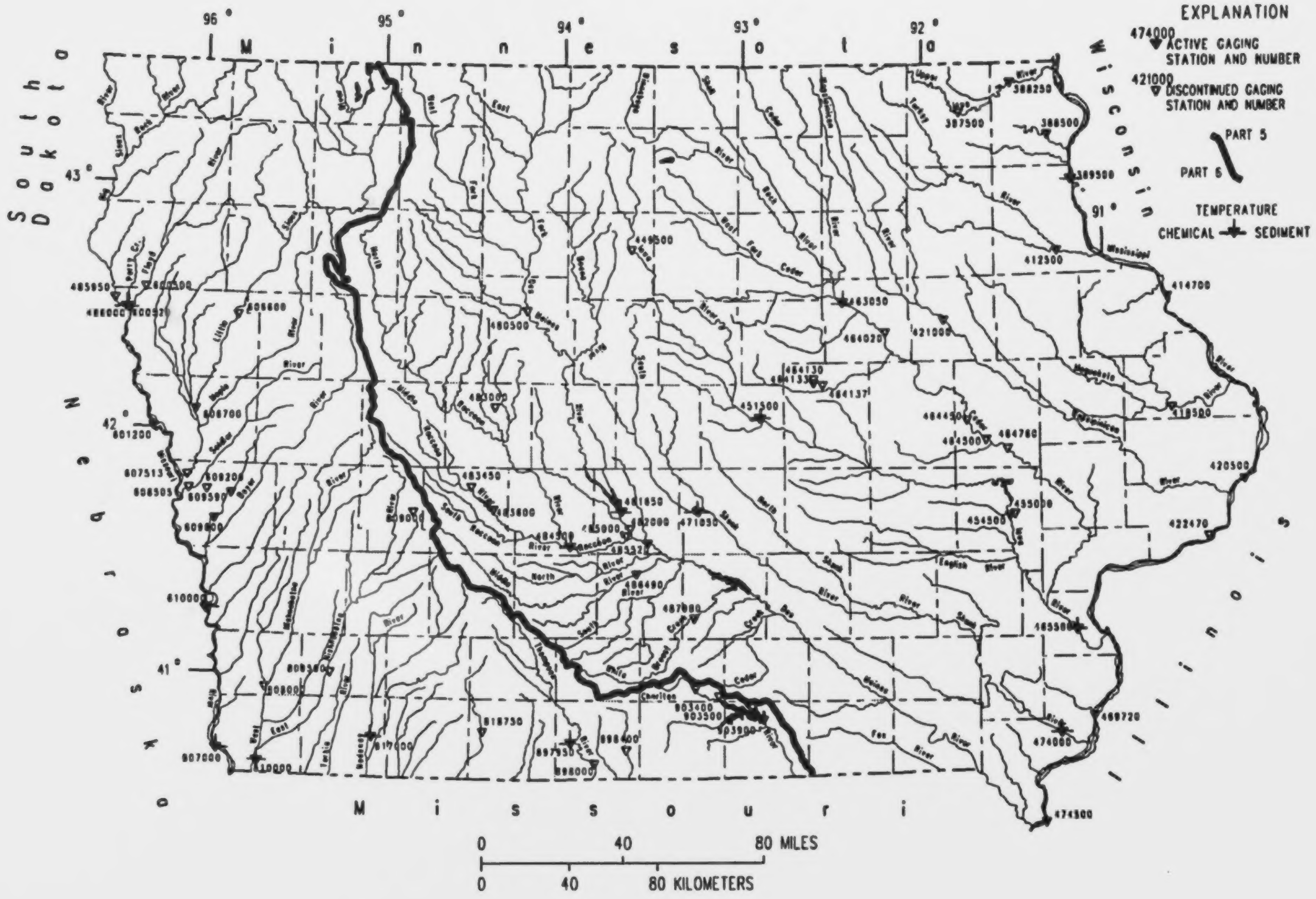

EXPLANATION
474000 ACTIVE GAGING STATION AND NUMBER
421000 DISCONTINUED GAGING STATION AND NUMBER
PART 5
PART 6
TEMPERATURE
CHEMICAL
SEDIMENT
96°
95°
94°
93°
92°
91°
43°
42°
41°
Minnesota
South Dakota
Nebraska
Missouri
Wisconsin
Illinois
0 40 80 MILES
0 40 80 KILOMETERS
388250
387500
388500
389500
412300
414700
418500
420500
422470
465500
469720
474000
474500
449500
463050
464020
421000
464130
464133
464137
451500
464450
464500
464760
455000
454500
480500
483000
483450
483600
481650
482000
471050
485000
484500
485527
486490
487980
485950
486000
600500
600520
605600
606700
601200
607513
608505
608200
609500
609800
610000
609000
809380
808000
807000
810000
817000
818750
897950
898000
898400
903400
903500
903900

Figure 4. -- Location of active and discontinued water-quality stations.

The maximum daily suspended-sediment discharge for water year 1989 in the Des Moines River near Saylorville, located in the Central Climatological District, was measured on May 24 and the minimum on January 10, 11.

The maximum daily suspended-sediment discharge for water year 1989 in the Nodaway River at Clarinda, located in the Southwest Climatological District, was measured on September 8 and the minimum on October 29, 30. The maximum suspended-sediment discharge was the result of as much as 10 inches of rainfall during early September. This is the only sediment station for which the 1989 suspended load exceeded the average annual suspended-sediment discharge. Runoff from the early September rains contributed 66 percent of the annual suspended-sediment discharge.

The rainstorms during water year 1989 produced the highest precipitation in the southwest part of the State and generally lessened in intensity to the north and east. The suspended-sediment discharge values at the daily sediment stations reflected the general storm paths during water year 1989.

Surface-Water Quality

Surface-water-quality data were collected in Iowa during water year 1989 at five National Stream-Quality Accounting Network (NASQAN) sites and one Hydrologic Benchmark Network (HBMN) site. The NASQAN sites are (fig. 4): (1) Nishnabotna River above Hamburg, (2) Raccoon River at Van Meter, (3) Iowa River at Wapello, (4) Skunk River at Augusta, and (5) Cedar River at Cedar Falls. The benchmark site is Elk Creek near Decatur City. The combined sites represent approximately 28,000 square miles of drainage area with generally uniform land use. Samples were collected at each site six times throughout the water year, except Elk Creek, which was only sampled once during the year due to lack of flow.

Samples collected at these stations indicate that water in the major streams generally is suitable for public water supply and most industrial purposes when properly treated. For the constituents analyzed, none of the samples had concentrations that exceeded Federal primary drinking-water-quality standards. However, water from all stations contained detectable concentrations of agricultural chemicals. Samples collected in May, June, and July from some stations contained concentrations of some herbicides above the U.S. Environmental Protection Agency (USEPA) proposed maximum contaminant level (PMCL) (USEPA, 1989, Proposed rule, National primary and secondary drinking water regulations; U.S. Federal Registar, Volume 54, Number 97, May 22, 1989 p. 22,064). During May, the samples from the Skunk River at Augusta contained concentrations of atrazine of 22 μg/L (micrograms per liter), cyanazine of 29 μg/L, and alachlor of 3.9 μg/L and in July the concentration of atrazine was 7.3 μ. During June, samples from the Nishnabotna River above Hamburg contained concentrations of atrazine of 5 μg/L.

A comparison between selected water-quality data for water year 1989 and data for the period of record are shown in figures 5, 6, and 7 for the Iowa River at Wapello, Skunk River at Augusta, and Nishnabotna River above Hamburg. Boxplots are used to compare the nitrate plus nitrite as nitrogen (hereafter referred to as nitrate in this report) and dissolved-solids concentrations of water year 1989 with historical statistics. Daily mean discharges for water year 1989 are also included to illustrate the general relation between flow conditions and water-quality data.

Concentrations of dissolved solids during water year 1989 were variable compared to historical monthly means for the period of record. Three of six samples from the Iowa River at Wapello (fig. 5) and four of six samples from the Skunk River at Augusta (fig. 6) were within the interquartile range (25th to 75th percentile). The July 1989 sample from the Iowa River had a concentration above the 75th percentile but below the 90th percentile, and the December 1988 and August 1989 samples had concentrations above the 90th percentile. The October 1988 sample from the Skunk River had a concentration near the 90th percentile and the December 1988 sample had a concentration above the 75th percentile but below the 90th percentile. Three of six samples from the Nishnabotna River above Hamburg (fig. 7) had concentrations within the interquartile range. Two samples, March and June 1989, had concentrations below the 10th percentile, and another, August 1989, was below the 25th percentile but above the 10th percentile.

Nitrate concentrations were all below historical means and below the interquartile range in most cases. All samples from the Iowa River at Wapello (fig. 5) contained nitrate concentrations below the 10th percentile, except the August sample for which the 25th percentile coincided with the detection level.

Four of six samples from the Skunk River at Augusta (fig 6) had nitrate concentrations near the 25th percentile. One sample (December 1988) had a concentration below the 10th percentile and one sample (July 1989) had a concentration below the 25th percentile but above the 10th percentile. Four of six samples from the Nishnabotna River above Hamburg (fig. 7) had nitrate concentrations below the 10th percentile. Two samples, (December 1988 and March 1989) had concentrations at or below the 25th percentile but above the 10th percentile.

Generally, periods of high nitrate concentrations, greater than 1 mg/L (milligrams per liter), occurred just after periods of increased discharge. Below normal precipitation is thought responsible for the general decrease in nitrate concentrations because nitrate derived from overland runoff and from nitrate-enriched ground-water seepage into streams was less than normal during this period.

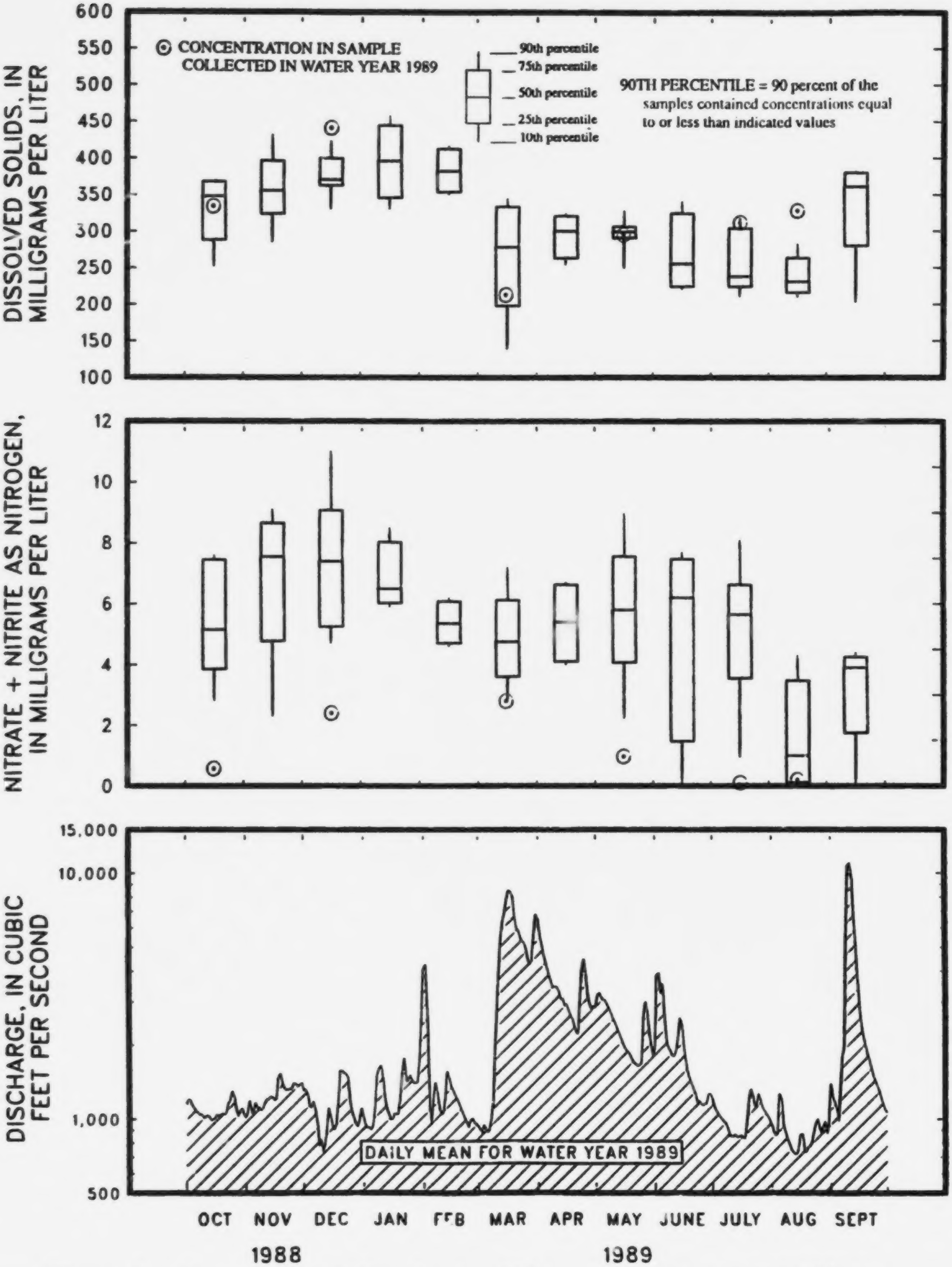


Figure 5.--Comparison of dissolved-solids and nitrate concentrations for water year 1989 with historical data summarized by monthly boxplots at the NASQAN station on the Iowa River at Wapello (station 05465500; period of record, water years 1978-89).

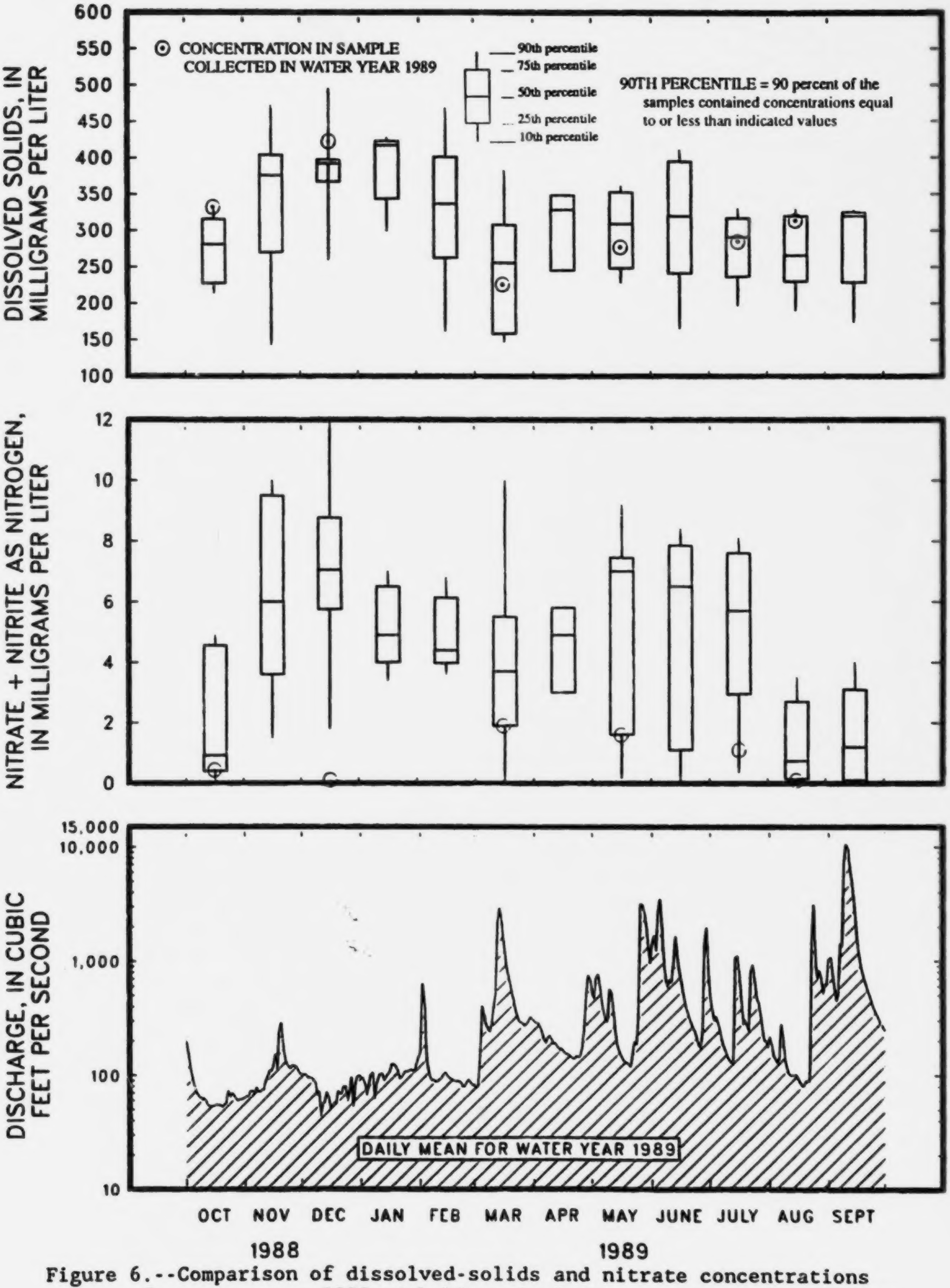


Figure 6.--Comparison of dissolved-solids and nitrate concentrations for water year 1989 with historical data summarized by monthly boxplots at the NASQAN station on the Skunk River at Augusta (station 05474000; period of record, water years 1978-89).

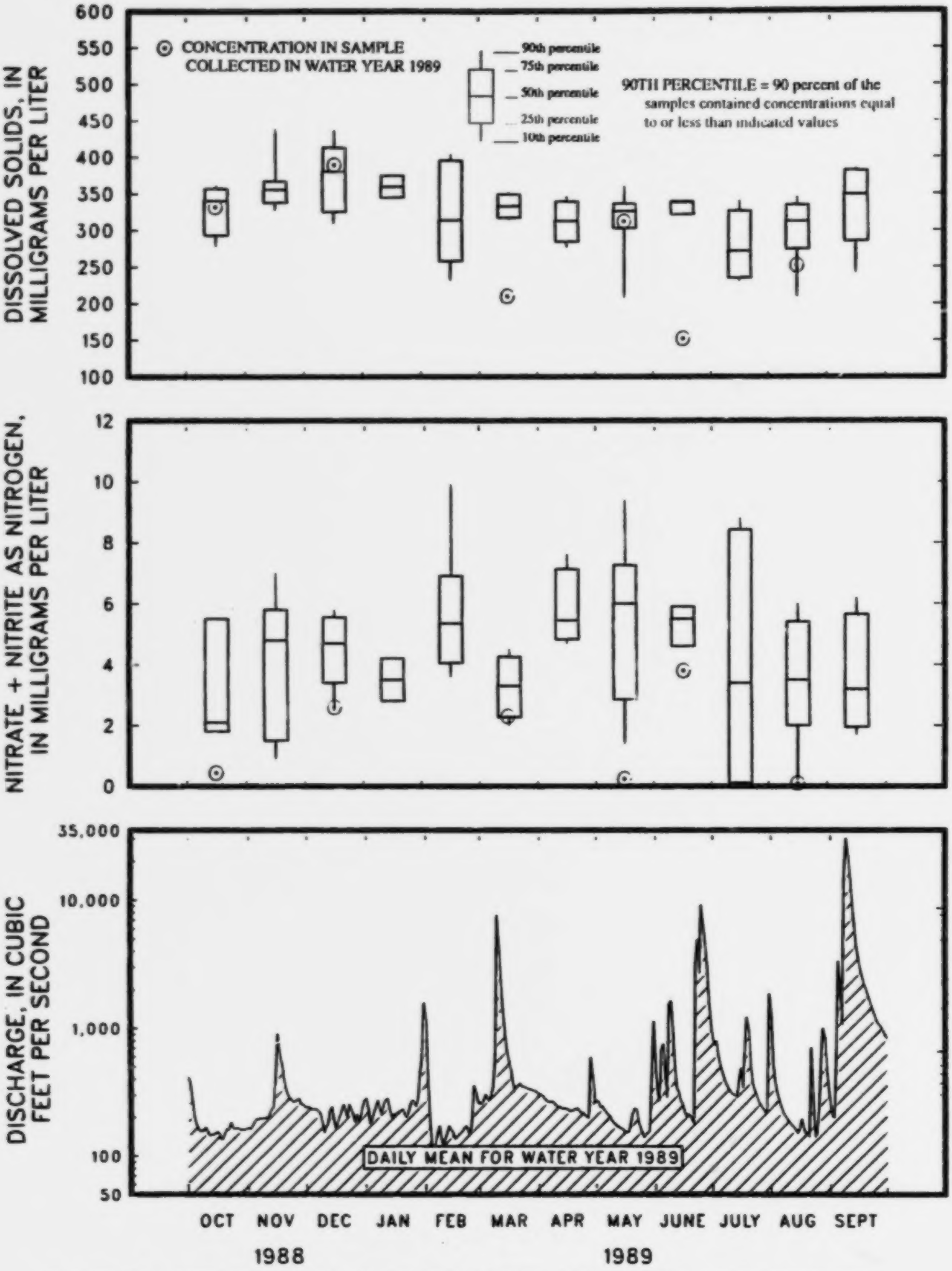


Figure 7.--Comparison of dissolved-solids and nitrate concentrations for water year 1989 with historical data summarized by monthly boxplots at the NASQAN station on the Nishnabotna River above Hamburg (station 05465500; period of record, water years 1978-89).

Ground Water

Monitoring the water-level changes in wells completed in the major aquifers in Iowa provides valuable information on the effects of climatic conditions and man-made stresses on the ground-water resources in Iowa. As the result of less-than-normal amounts of precipitation during water years 1988 and 1989, low water levels were measured in observation wells penetrating the major aquifers in the State during water year 1989. The ground-water-level observation network in Iowa consists of approximately 240 observation wells in which water levels are measured on a quarterly, monthly, daily, or intermittent basis (fig. 8).

Ground-water supplies in Iowa are withdrawn from both unconsolidated aquifers and, in most areas, deeper bedrock aquifers. The unconsolidated aquifers consist of alluvial sand and gravel, glacial drift, and sand and gravel overlain by glacial drift. Buried-channel aquifers exist where coarse sand and gravel was deposited in bedrock valleys and overlain by glacial drift. The major bedrock aquifers are: (1) Dakota aquifer, in sandstone of Cretaceous age, (2) Mississippian aquifer, in limestone and dolomite of Mississippian age, (3) Silurian-Devonian aquifer, in dolomite of Silurian and limestone of Devonian age, (4) Cambrian-Ordovician aquifer, in dolomite and sandstone of Late Cambrian and Early Ordovician age, and (5) Dresbach aquifer, in sandstone of Cambrian age.

Recharge to the unconsolidated aquifers occurs mainly by infiltration of precipitation and is dependent on the amount of precipitation received in the area. Water levels in alluvial and glacial-drift aquifers commonly exhibit a moderate rise in level during the fall, then a gradual decline during the winter. In the spring, precipitation and runoff from snowmelt produce an observable rise in the water levels followed by a gradual decline throughout the summer growing season. In water year 1989 however, monthly precipitation was below the 1951-80 statewide monthly normal except for rains in November 1988 and September 1989 (table 1). This lack of precipitation, in conjunction with the low water levels measured during water year 1988, resulted in water levels in shallow, water-table wells at or below the historical average throughout the State until September 1989 (fig. 9). The water level in a well penetrating glacial drift of Pleistocene age in Linn County was near or below the historical average from December 1988 through the remainder of 1989. With the exception of July 1989, the water level in the Harcourt well penetrating glacial drift in Webster County was below the historical average until the end of water year 1989, when the area received 137 percent of normal rainfall. Water levels were consistently near or slightly below average until the end of water year 1989 for a Marion County well penetrating glacial drift.

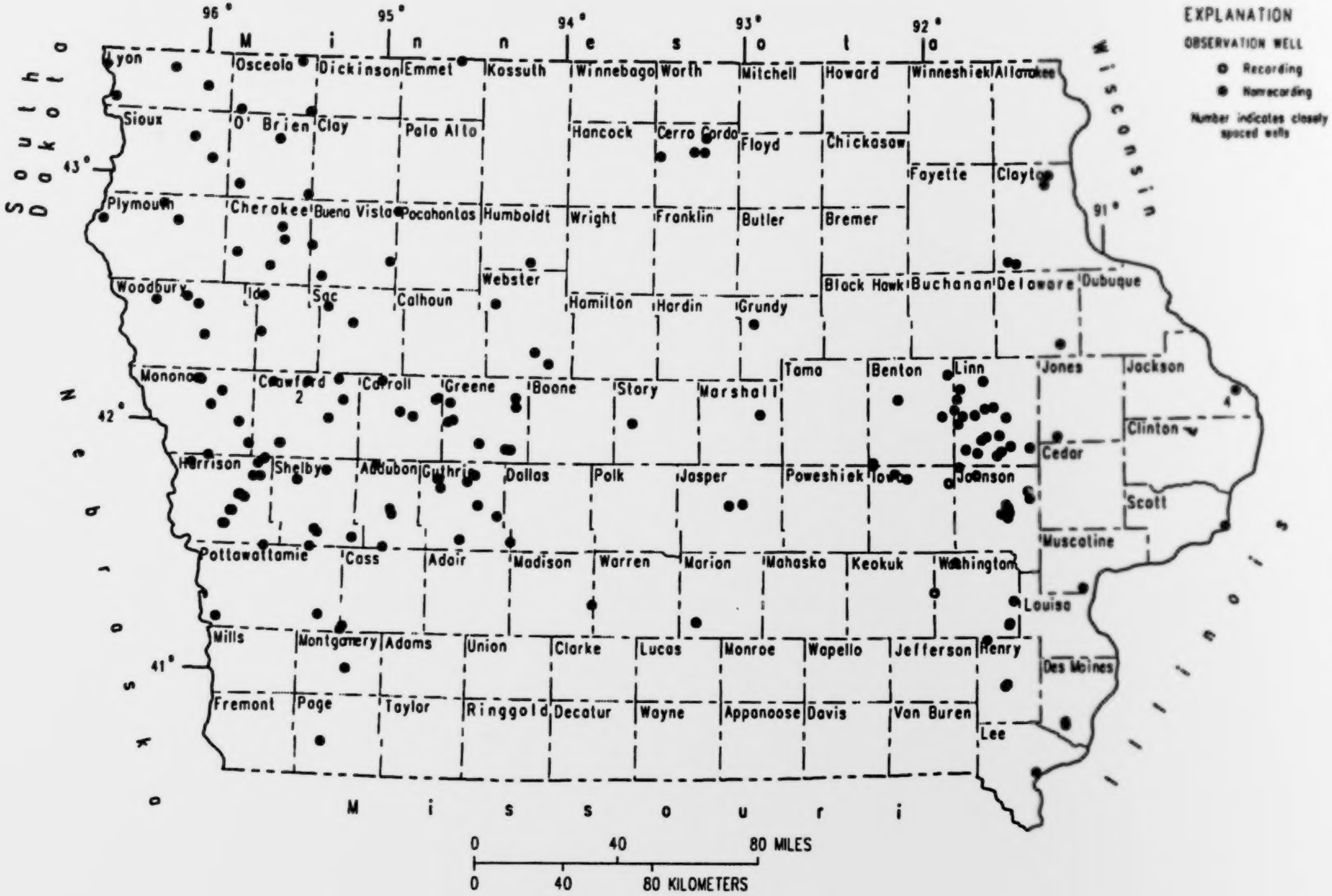

EXPLANATION
OBSERVATION WELL
○ Recording
● Nonrecording
Number indicates closely spaced wells
96°
95°
94°
93°
92°
91°
43°
42°
41°
Minnesota
South Dakota
Nebraska
Missouri
Wisconsin
Illinois
Lyon
Osceola
Dickinson
Emmet
Kossuth
Winnebago
Worth
Mitchell
Howard
Winneshiek
Allamakee
Sioux
O' Brien
Clay
Palo Alto
Hancock
Cerro Gordo
Floyd
Chickasaw
Fayette
Clayton
Plymouth
Cherokee
Buena Vista
Pocahontas
Humboldt
Wright
Franklin
Butler
Bremer
Woodbury
Ida
Sac
Calhoun
Webster
Hamilton
Hardin
Grundy
Black Hawk
Buchanan
Delaware
Dubuque
Tama
Benton
Linn
Jones
Jackson
Monona
Crawford
2
Carroll
Greene
Boone
Story
Marshall
Clinton
4
Cedar
Harrison
Shelby
Audubon
Guthrie
Dallas
Polk
Jasper
Poweshiek
Iowa
Johnson
Scott
Muscatine
Pottawattamie
Cass
Adair
Madison
Warren
Marion
Mahaska
Keokuk
Washington
Louisa
Mills
Montgomery
Adams
Union
Clarke
Lucas
Monroe
Wapello
Jefferson
Henry
Des Moines
Fremont
Page
Taylor
Ringgold
Decatur
Wayne
Appanoose
Davis
Van Buren
Lee
0
40
80 MILES
0
40
80 KILOMETERS

Figure 8. -- Location of recording and nonrecording observation wells.

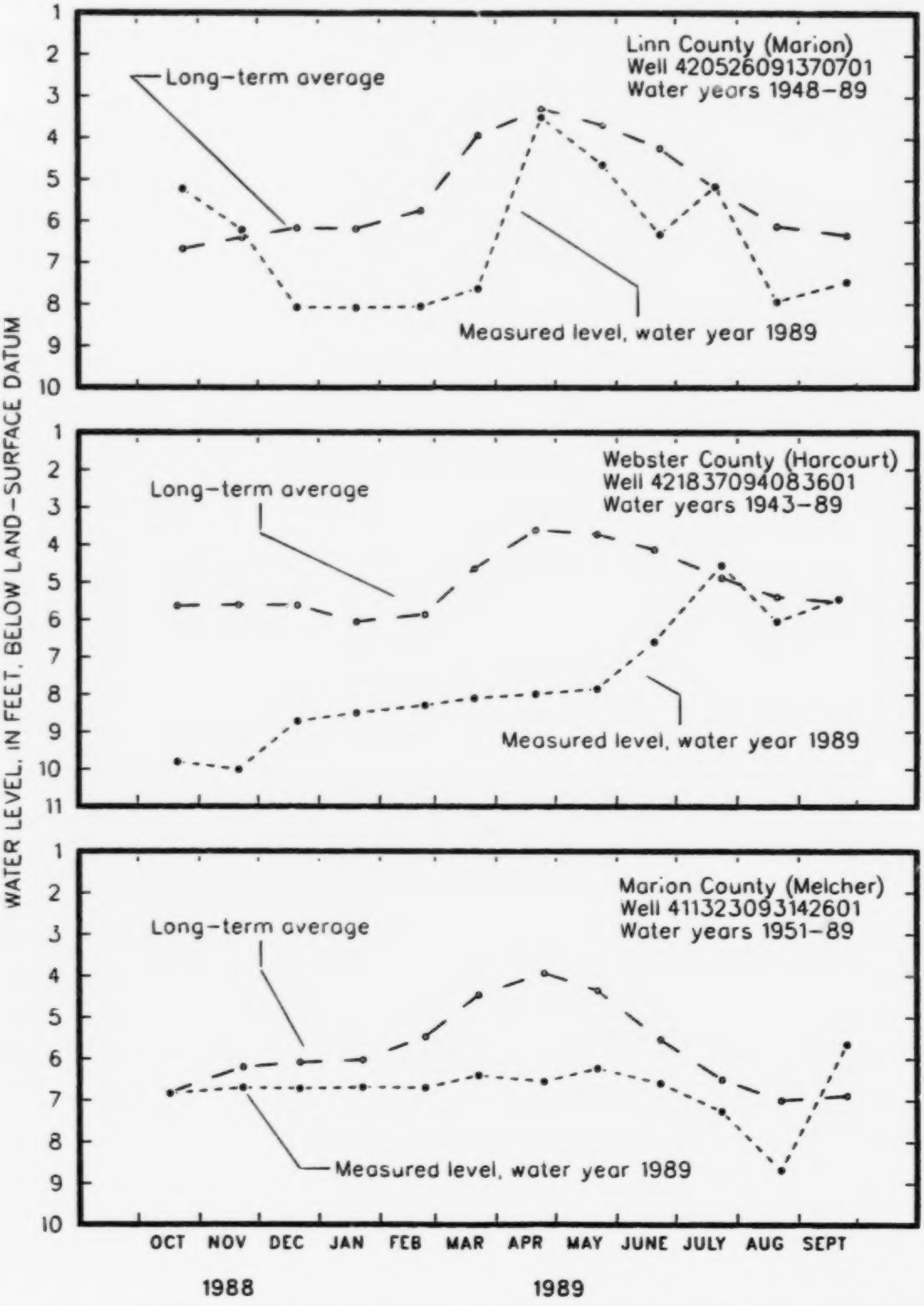


Figure 9.--Monthly water levels during water year 1989 compared to the average monthly levels for the period of record.

Thirty historical low water levels were measured in alluvial, glacial-drift, and buried-channel wells across the State in water year 1989 (table 3). Prior to water year 1989, many of the record low water levels for these wells were measured during water year 1988. In a shallow, water-table alluvial well in Shelby County penetrating the West Nishnabotna alluvial aquifer, a historical low of 18.17 feet below land-surface datum was measured on July 5, 1989, 1.62 feet lower than the previous historical low measured in July 1988. A well penetrating glacial drift in Humboldt County had a historical low water level of 16.72 feet below land-surface datum, 2.37 feet below the previous historical low of 14.35 feet measured in August 1988.

Table 3.--Historical low water levels measured during water year 1989 in wells completed into unconsolidated aquifers. Water-level measurements are in feet below land-surface datum.

County	Well Number	Aquifer	Historical Low	Date Measured	Previous Historical Low	Date Measured
Audubon	413843094541701	East Nishnabotna alluvial	18.81	10/19/88	18.34	07/20/88
Benton	415211092164101	Iowa alluvial	7.50	10/06/88	7.49	08/29/88
Cass	411117095091902	East Nishnabotna alluvial	21.59	05/25/89	21.50	09/10/88
Cerro Gordo	430658093281001	glacial drift	55.49	03/20/89	54.67	08/23/88
Crawford	415512095313801	Boyer alluvial	26.09	08/09/89	25.90	01/09/86
Greene	415448094163401	North Raccoon alluvial	20.83	01/17/89	20.78	10/07/85
Greene	415449094155601	glacial drift	39.52	07/12/89	37.84	10/07/85
Greene	420507094141801	buried channel	42.81	07/12/89	41.70	07/18/88
Greene	420723094143201	buried channel	41.43	07/12/89	40.18	07/18/88
Guthrie	414110094260501	South Raccoon alluvial	11.07	10/19/88	10.54	10/08/85
Guthrie	414728094392401	South Raccoon alluvial	16.65	04/04/89	15.81	10/08/85
Harrison	413024095353901	glacial drift	60.54	07/05/89	58.35	07/20/88
Harrison	414226095435002	Boyer alluvial	14.27	08/09/89	14.10	09/09/88
Harrison	414228095442301	Boyer alluvial	22.43	08/09/89	21.35	09/09/88
Harrison	415124095361501	Boyer alluvial	15.59	08/09/89	15.25	09/09/88
Harrison	415109095363201	Boyer alluvial	12.47	08/09/89	12.06	09/09/88
Harrison	414702095395101	Boyer alluvial	12.51	08/09/89	11.43	09/09/88
Humboldt	424039094103601	glacial drift	16.72	03/16/89	14.35	08/15/88
Iowa	414930092093801	Iowa alluvial	10.55	01/03/89	9.91	08/29/88
Iowa	414816092053401	Iowa alluvial	9.19	07/27/89	8.67	08/29/88
Iowa	415125092164201	Iowa alluvial	13.47	07/27/89	13.16	08/29/88
Monona	420730095910701	Maple alluvial	15.21	07/07/89	14.27	10/15/84
Monona	421006095580301	Little Sioux alluvial	13.92	07/07/89	13.04	07/18/88
Muscatine	412120091050401	alluvial	17.86	08/02/89	17.72	08/09/88
Pottawattamie	411024095095502	East Nishnabotna alluvial	9.95	05/25/89	9.54	09/10/88
Shelby	413442095193101	West Nishnabotna alluvial	22.98	10/19/88	22.42	07/20/88
Shelby	413359095182701	buried channel	153.16	07/05/89	150.98	01/08/83
Shelby	413031095204901	West Nishnabotna alluvial	18.17	07/05/89	16.55	07/20/88
Shelby	414856095160101	buried channel	210.95	07/05/89	209.91	09/06/83
Washington	421829091304701	glacial drift	12.65	11/01/88	11.49	09/13/88

While not directly dependent on local infiltration by precipitation, recharge to the deeper bedrock aquifers is still affected by changes in climatic conditions. The above-average precipitation in the mid-1980's provided sufficient recharge to the deeper aquifers so that effects on water levels in these aquifers were minimized during the periods of less-than-normal precipitation that the State experienced during water years 1988 and 1989. Water levels in these wells were affected by the less-than-normal amounts of precipitation in the areas of recharge, although low water levels were not measured until the end of water year 1988. The rate of decline in the water levels in wells in the bedrock aquifers accelerated during water year 1989, due to withdrawals by pumpage and the lack of adequate precipitation in the recharge areas.

During water year 1989, historical low water levels were measured in 41 wells completed in bedrock aquifers (table 4). Every principal aquifer recorded a noticeable decline, with historical low water levels measured in wells penetrating each aquifer. Almost one-half of the previous historical low water levels that were surpassed in water year 1989 were measured during water year 1988. In Benton County, historical low water levels were measured in 4 wells penetrating the Silurian, Devonian and Ordovician, rocks in water year 1989. The previous historical water levels for these wells were measured during water year 1977 and 1988, when the State experienced less-than-normal precipitation. In Des Moines County in southeast Iowa, a Devonian-Mississippian well with 39 years of record had a new historical low water level of 86.04 feet below land-surface datum on April 22, 1989. This historical low water level surpassed the previous historical low measured in April 1950 by 2.85 feet. A well completed in Devonian rocks in Johnson County in east-central Iowa with 48 years of record had the historical low water level of 21.05 feet below land-surface datum measured in September 1957 broken with a new low of 21.65 feet measured on August 21, 1989.

Ground-Water Quality

The ground-water-quality monitoring program has been operated by the U.S. Geological Survey in cooperation with the University of Iowa Hygienic Laboratory and the Iowa Geological Survey Bureau since 1982. Since 1985, the program has emphasized the analysis of water samples for nitrogen and herbicides primarily from municipal wells with depths less than 200 feet. Approximately 200 wells out of an inventory of 1200 wells throughout the State are sampled each year on a rotating basis. Initially, wells were sampled once a year during the months from April to November. In 1988, a group of wells that have consistently yielded water containing relatively large concentrations of nitrate, herbicides, or both, were sampled three times during the year to assess the seasonal variation. In general, water year 1989 has been a continuation of this sampling strategy.

Table 4.--Historical low water levels measured during water year 1989 in wells completed in bedrock aquifers. Water levels are in feet below land-surface datum.

County	Well Number	Aquifer	Historical Low	Date Measured	Previous Historical Low	Date Measured
Audubon	413044094565601	Dakota	53.09	07/05/89	53.05	08/03/82
Audubon	413958094544501	Dakota	40.71	04/05/89	37.62	08/20/81
Benton	420319091540102	Silurian-Devonian	167.63	09/11/89	166.92	08/09/77
Benton	420731092083801	Devonian	64.96	10/12/88	64.80	06/29/77
Benton	420731092083803	Devonian	65.03	10/12/88	64.86	06/29/77
Benton	421326091522701	Silurian-Devonian-Ordovician	151.64	08/24/89	149.86	08/17/88
Carroll	420705094394501	Dakota	56.14	07/12/89	54.90	01/07/86
Carroll	420233094475901	Dakota	21.54	04/03/89	20.77	07/18/88
Clayton	424057091320001	Silurian-Orodovician	134.76	08/01/89	133.18	02/04/68
Delaware	422029091144302	Silurian	26.49	07/31/89	24.37	09/30/88
Des Moines	404753091142501	Devonian-Mississippian	86.04	04/22/89	83.19	04/26/50
Greene	415449094161501	Pennsylvanian	5.93	07/12/89	5.57	01/07/86
Greene	415449094173201	Pennsylvanian	73.09	07/12/89	72.59	01/07/86
Greene	415608094260701	Dakota	14.72	07/12/89	14.53	01/07/86
Guthrie	414514094381601	Dakota	12.75	10/19/88	11.66	01/08/86
Harrison	414955096000601	Pennsylvanian	64.50	07/07/89	64.07	01/15/82
Jasper	414147093035401	Cambrian-Ordovician	272.07	07/20/89	271.19	09/16/87
Johnson	414107091322901	Silurian	148.60	08/02/89	146.90	07/01/88
Johnson	413955091320303	Silurian-Devonian	169.22	09/05/89	168.40	07/27/78
Johnson	414315091252002	Devonian	21.65	08/21/89	21.05	09/26/57
Johnson	414853091425101	Silurian-Devonian	76.97	10/06/88	76.64	09/06/88
Johnson	415052091483801	Silurian-Devonian	90.38	09/11/89	87.44	09/12/88
Jones	415808091160501	Silurian	6.21	09/11/89	5.68	09/12/88
Linn	415534091251102	Cambrian-Orduvician	337.96	09/25/89	336.61	08/23/88
Linn	415556091313001	Silurian	52.95	09/11/89	51.16	07/06/77
Linn	415509091461801	Silurian-Devonian	109.17	09/11/89	108.37	07/22/77 and 07/23/77
Linn	420508091395811	Silurian	55.27	09/11/89	54.38	03/06/77
Linn	421149091403301	Silurian-Devonian	33.61	09/11/89	32.87	03/23/77
Linn	420954091480801	Silurian-Devonian	34.58	09/11/89	32.31	09/12/88
Lyon	431812096302701	Dakota	101.30	07/06/89	97.56	12/09/82
Lyon	432553096105701	Dakota	114.68	09/12/89	114.60	05/07/85
Monona	421018095582001	Dakota	15.77	10/17/88 and 07/07/89	14.84	07/18/88
Osceola	431620095482402	Dakota	226.19	07/06/89	221.78	07/20/88
Osceola	432828095283611	Dakota	344.88	01/18/89	344.54	05/24/88
Plymouth	425249096125001	Dakota	122.35	07/06/89	122.00	03/27/80
Sac	422850095171501	Dakota	292.28	05/31/89	291.90	09/18/87 and 05/26/88
Shelby	414624095252301	Dakota	116.56	07/05/89	109.29	04/12/88
Sioux	430913096033201	Dakota	195.12	07/06/89	194.88	07/20/88
Washington	411300091320701	Mississippian	76.22	09/05/89	75.40	09/02/88
Washington	411244091323501	Mississippian	78.50	09/05/89	77.98	09/02/88
Washington	412037091564701	Mississippian	25.29	08/23/89 and 08/24/89	24.11	09/26/88 and 09/27/88

During water year 1989, 222 untreated water samples were collected from 145 municipal wells (fig. 10) throughout the State. These samples were analyzed by the University of Iowa Hygienic Laboratory, and the results of the analyses are published in this report. Single samples were collected from 93 of these wells during July and August. These wells were selected on the basis of having been completed at depths of 250 feet or less and were located in communities for which water-quality data has not been obtained as part of the monitoring program since 1985. Samples were analyzed for common dissolved constituents, nutrients, and common herbicides. Samples from the other 52 municipal wells were collected in spring, summer, and fall, and analyzed for nutrients and common herbicides. The spring samples were also analyzed for common dissolved constituents. Only 25 samples collected during the fall were analyzed in time to be included in this report.

Of the 93 wells from which only one sample was collected, 60 percent were less than 200 feet deep; 43 percent were completed in unconsolidated aquifers, and 57 percent were completed in bedrock aquifers. Nitrate concentration exceeded the detection level in 39 wells, ammonia in 61 wells, atrazine in 13 wells, cyanazine in 8 wells, alachlor in 3 wells, and metolachlor in 2 wells.

Concentrations of nitrate were greater than or equal to 3 mg/L in water from 21 of the 93 wells. Generally, nitrate concentrations greater than 3 mg/L can be attributed to human activities (Madison, R.J., and Brunett, J.O., 1984, Overview of the occurrence of nitrate in ground water of the United States, in National Water Summary 1984--Water-Quality Issues: U.S. Geological Survey Water-Supply Paper 2275, p. 93-103). None of the samples exceeded the USEPA maximum contaminant level (MCL) for public drinking-water of 10 mg/L (USPEA, 1989, Maximum contaminant levels, subpart B of part 141, National primary drinking water regulations: U.S. Code of Federal Regulations, Title 40, Part 141 revised as of July 1, 1989, p. 547-551).

Water from 18 of the 93 wells contained detectable concentrations of one or more herbicides. Herbicides did not exceed MCL's or proposed MCL's for any of the wells. The largest herbicide concentration was 1.6 μg/L of atrazine. Twelve of the samples were collected from wells less than 200 feet deep and the remaining six were from wells 200 to 250 feet deep. This distribution may be important because detectable concentrations of herbicides generally are not found in wells greater than 200 feet deep. The 19 percent rate of occurrence for water year 1989 is larger than the rate of occurrence for the same period last year, 6 percent, and more similar to the 22 percent rate described by (Detroy, M.G., 1988, Ground-water-quality-monitoring program in Iowa: Nitrate and pesticides in shallow aquifers: U.S. Geological Survey Water-Resources Investigations Report 88-4123, 32 p.) for the same periods prior to 1988. However, a direct comparison may be misleading because different wells were sampled in water year 1989. Below-normal precipitation, which persisted in much of the State during the water year, may have reduced the occurrence rate because infiltrating precipitation did not leach agricultural chemicals into the ground water.

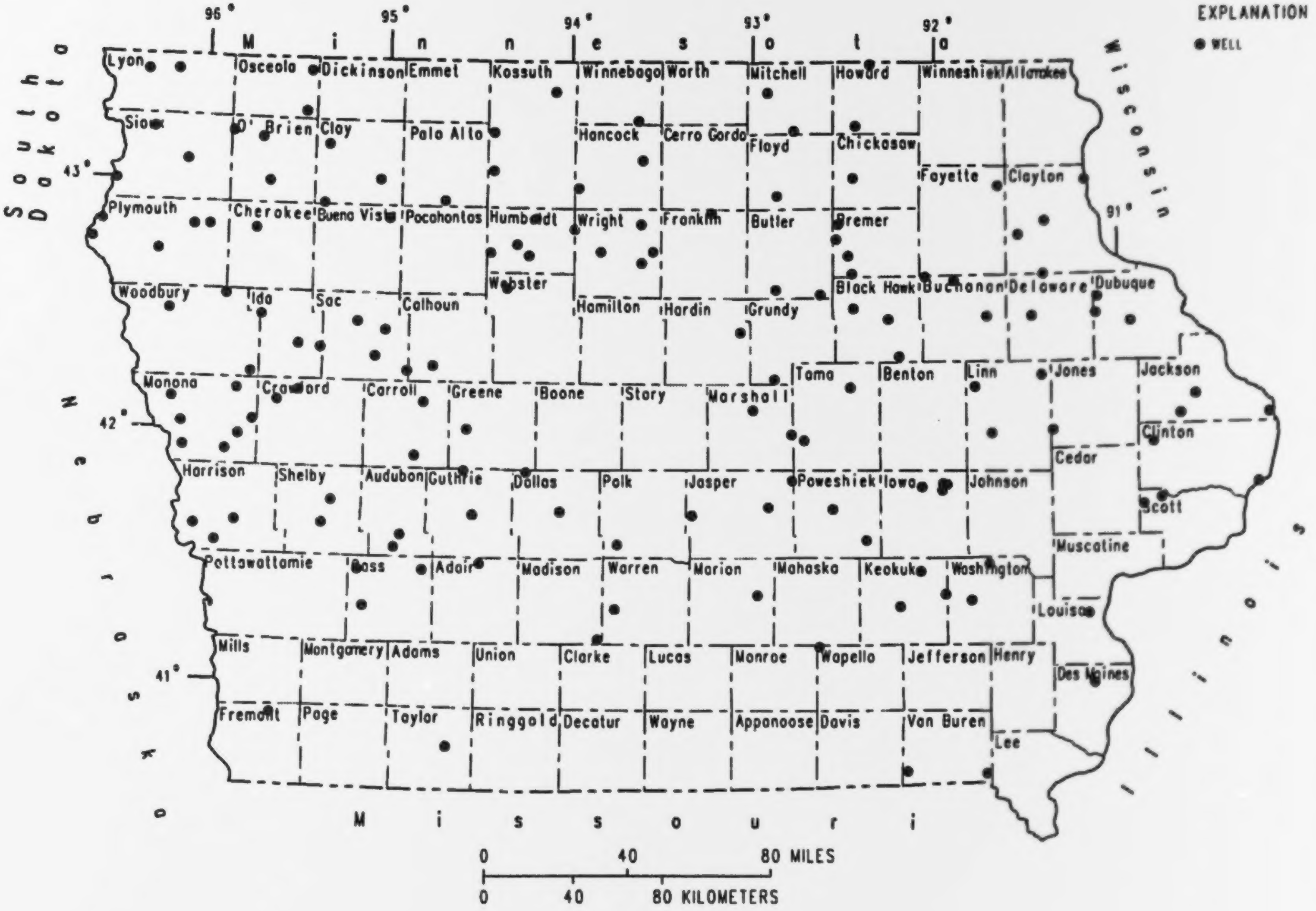

EXPLANATION
● WELL
96°
95°
94°
93°
92°
91°
43°
42°
41°
Minnesota
Wisconsin
Illinois
Missouri
Nebraska
South Dakota
Lyon
Osceola
Dickinson
Emmet
Kossuth
Winnebago
Worth
Mitchell
Howard
Winneshiek
Allamakee
Sioux
O' Brien
Clay
Palo Alto
Hancock
Cerro Gordo
Floyd
Chickasaw
Fayette
Clayton
Plymouth
Cherokee
Buena Vista
Pocahontas
Humboldt
Wright
Franklin
Butler
Bremer
Webster
Woodbury
Ida
Sac
Calhoun
Hamilton
Hardin
Grundy
Black Hawk
Buchanan
Delaware
Dubuque
Monona
Crawford
Carroll
Greene
Boone
Story
Marshall
Tama
Benton
Linn
Jones
Jackson
Clinton
Cedar
Harrison
Shelby
Audubon
Guthrie
Dallas
Polk
Jasper
Poweshiek
Iowa
Johnson
Scott
Muscatine
Pottawattamie
Cass
Adair
Madison
Warren
Marion
Mahaska
Keokuk
Washington
Louisa
Mills
Montgomery
Adams
Union
Clarke
Lucas
Monroe
Wapello
Jefferson
Henry
Des Moines
Fremont
Page
Taylor
Ringgold
Decatur
Wayne
Appanoose
Davis
Van Buren
Lee
0 40 80 MILES
0 40 80 KILOMETERS

Figure 10. -- Location of wells where water samples were collected during water year 1989.

Of the 52 wells from which samples were collected more than once, all were less than 200 feet deep; 39 were completed in unconsolidated surficial aquifers, and 13 were completed in bedrock aquifers. Water samples from these wells have historically contained detectable concentrations of agricultural chemicals. Water year 1989 was no exception. Nitrate was present at concentrations above the detection level in water samples from 49 wells, at least once during the year. Ammonia was present in 10 wells, atrazine in 27 wells, cyanazine in 8 wells, metolachlor in 7 wells, alachlor in 3 wells, and metribuzin in 1 well. In general, water samples from wells that contained agricultural chemicals during the first sampling period were found to contain them during subsequent sampling periods. Concentrations varied little between sampling periods except for a few wells; however, all of the samples for the third period were not collected in time for inclusion in this report.

Of the 52 wells with multiple samples, nitrate concentrations were larger than or equal to 3 mg/L in water sampled from 41 wells, and concentrations were greater than or equal to 10 mg/L in water sampled from 10 wells at least once during the water year. Samples from four wells had concentrations of atrazine that exceeded the USEPA PMCL for this compound at least once during the water year. The largest herbicide concentration was 13 μg/L of atrazine.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already- existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Radiochemical Program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1989 water year that began October 1, 1988, and ended September 30, 1989. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for surface and ground water, and ground-water-level data. The locations of the stations and wells where the data were collected are shown in figures 4, 8, 10-12. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

Station Identification Numbers

Each data station, whether streamsite or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells.

Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indention in the "List of Stations" in the front of this report. Each indention represents one rank. This downstream order and system of indention shows which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

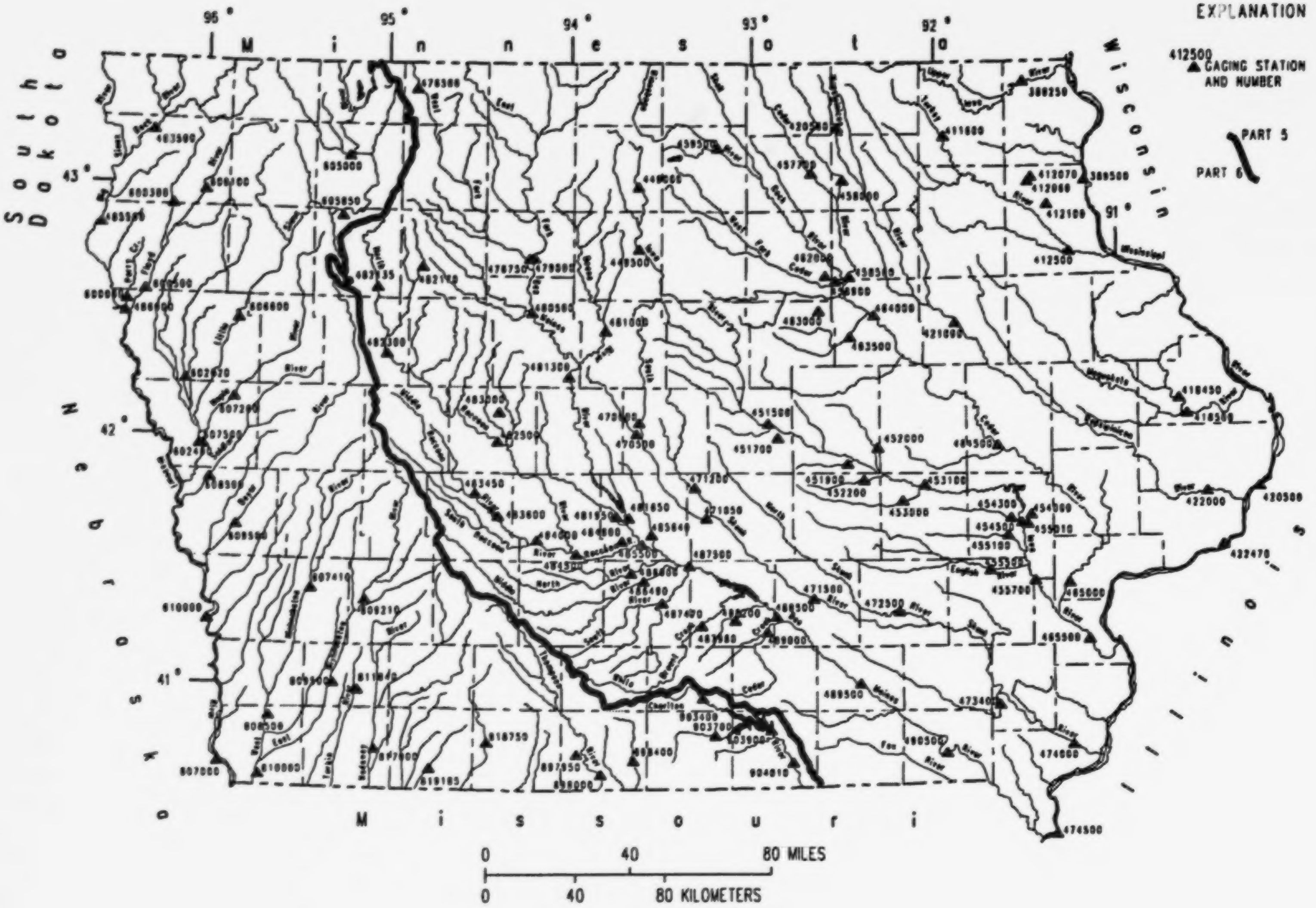

EXPLANATION
412500 ▲ GAGING STATION AND NUMBER
PART 5
PART 6
96°
95°
94°
93°
92°
91°
43°
42°
41°
Minnesota
Wisconsin
South Dakota
Nebraska
Missouri
Illinois
Mississippi River
0 40 80 MILES
0 40 80 KILOMETERS

Figure 11. -- Location of active, continuous-record gaging stations.

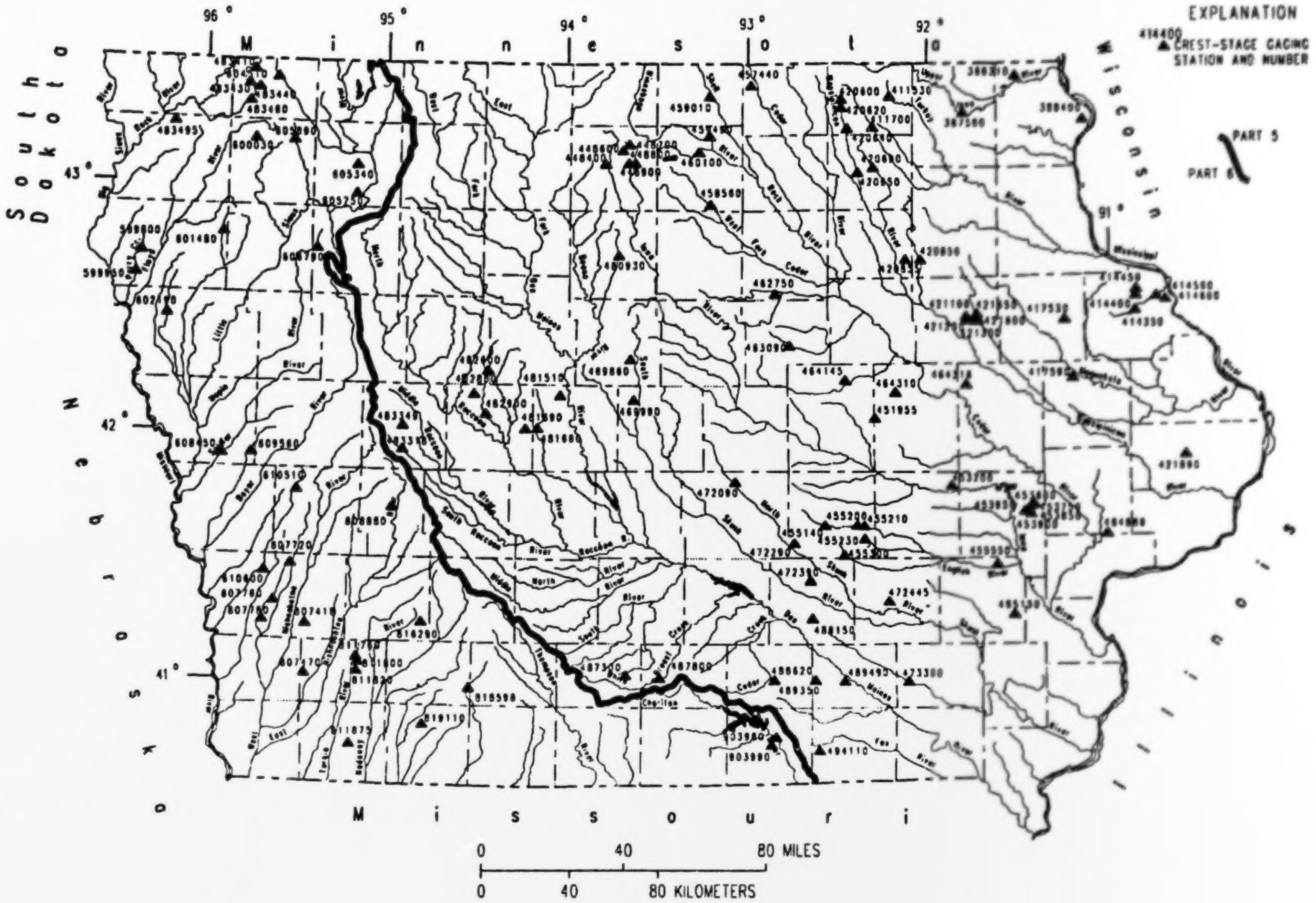

EXPLANATION
▲ CREST-STAGE GAGING STATION AND NUMBER
414400
PART 5
PART 6
96°
95°
94°
93°
92°
91°
43°
42°
41°
Minnesota
Wisconsin
Illinois
Missouri
Nebraska
South Dakota
0 40 80 MILES
0 40 80 KILOMETERS

Figure 12. -- Location of active, crest-stage gaging stations.

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 05388250, which appears just to the left of the station name, includes the two-digit Part number "05" plus the six-digit downstream-order number "388250." The Part number designates the major river basin; for example, Part "05" is the Mississippi River Basin.

Latitude-Longitude System

The identification numbers for wells and miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a 1-second grid. This site-identification number, once assigned, is a pure number and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description. (See figure below.)

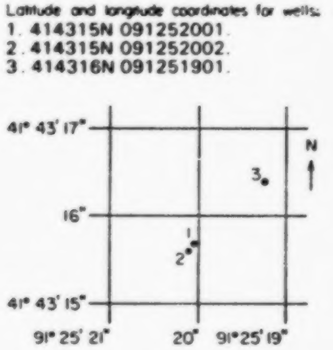


Figure 13.--Latitude-longitude well number.

Numbering System For Wells

Each well is identified by means of (1) a 15-digit number that is based on the grid system of latitude and longitude, and (2) a local number that is provided for continuity with older reports and for other use as dictated by local needs. The former number serves not only to identify the well but also to locate it as a point on a map (fig. 10). For maximum utility, latitude and longitude code numbers are determined to seconds in order that each well may have a unique number. The first six digits denote degrees, minutes, and seconds of north latitude; the next seven digits are degrees, minutes, and seconds of west longitude; and the last two numbers are a sequential number assigned in the order in which the wells are located in a 1-second quadrangle.

The local well numbers are in accordance with the Bureau of Land Management's system of land subdivision. Each well number is made up of three segments. The first segment indicates the township, the second the range, and the third the section in which the well is located (fig. 14). The letters after the section number which are assigned in a counter-clockwise direction (beginning with "A" in the northeast quarter), represent subdivisions of the section. The first letter denotes a 160-acre tract, the second a 40-acre tract, the third a 10-acre tract, and the fourth a 2.5 acre tract. Numbers are added as suffixes to distinguish wells in the same tract. Thus, the number 96-20-3CDBD1 designates the well in the SE 1/4 NW 1/4 SE 1/4 SW 1/4 sec.3, T.96 N., R.20 W.

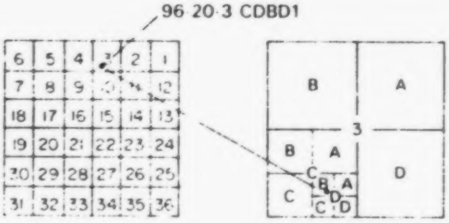


Figure 14.--Local well-numbering system for well 96-20-3CDBD1.

Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations." Location of all complete-record surface water stations which are given in this report are shown in figure 11.

Partial records are obtained through discrete measurements without using a continuous stage-recording device and generally pertain only to a characteristic of either high, medium or low flow. The location of all active, crest-stage gaging stations are shown in figure 12.

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-capacity curves or tables to compute lake storage.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adopted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope- area or contracted-opening measurements, and computations of flow over dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations, the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relation changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relation. Even when this is done, the contents computed may become increasingly in error as the lapsed time since the last survey increases. Discharges over lake or reservoir spillways are computed using stage-discharge relations.

For some gaging stations, there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For these periods, the daily discharges are estimated from the recorded range in stage, discharge computed before and after the missing record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic mean of the water-year mean discharges. It is computed only for stations having at least 5 water years of complete record, and only water years of complete record are included in the computation. It is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water developments significantly altering flow at a station are put into use after the station has been in operation for a period of years, a new average is computed as soon as 5 water years of record have accumulated following the development. The median of yearly mean discharges also is given under this heading for stations having 10 or more water years of record, if the median differs from the average given by more than 10 percent.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

EXTREMES FOR CURRENT YEAR.--Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the offices whose addresses are given on the back of the title page of this report to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

The daily table for stream-gaging stations gives mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN."), or in acre-feet (line headed "AC-FT"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversions or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Data collected at partial-record stations follow the information for continuous-record sites. This section consists of a table of annual maximum stage and discharge for crest-stage stations.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified by listing the dates of the estimated record in the REMARKS paragraph of the station description.

Accuracy of the Records

The accuracy of streamflow records depends primarily on: (1) The stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements; and (2) the accuracy of measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of their true values; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft^3/s the nearest tenth between 1.0 and 10 ft^3/s; to whole numbers between 10 and 1,000 ft^3/s; and to 3 significant figures for more than 1,000 ft^3/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published.

Other Records Available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables is on file in various field offices of the Iowa District. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the offices whose addresses are given on the back of the title page of this report.

Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

Classification of records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 4.

Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

On-site measurements and sample collection

In obtaining water-quality data, a major concern needs to be assuring that the data obtained represent the in-situ quality of the water. To assure this, certain measurements, such as water temperature, pH, alkalinity and dissolved oxygen, are made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures are followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures of onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. C2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. All of these references are listed on p. 52-53 of this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey District office.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain the representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis.

Water temperature and specific conductance

Water temperatures are measured at most of the water-quality stations. The measurement of temperature and specific conductance is performed during each regular site visit (usually at a six week interval) to stream-gaging stations. Records of stream temperature indicate significant thermal characteristics of the stream when analysed over a long period of record. Large streams have small daily temperature variations while shallow streams may have a daily range of several degrees and may closely follow the changes in air temperature. Furthermore, some streams may be affected by waste-heat discharge.

Specific conductance can be used as a general indicator of stream quality. This determination is easily made in the field with a portable meter, and the results are very useful as general indicators of dissolved-solids concentration or as a base for extrapolating other analytical data. Records for temperature and specific conductance appear in the section "Analyses of samples collected at miscellaneous sites".

Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samples. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

During periods of rapidly changing flow or rapidly changing concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of the quantities of suspended-sediment, records of the periodic measurements of the particle-size distribution of the suspended-sediment and bed material are included. Miscellaneous suspended-sediment samples were collected during flood events have been included with the station's water quality data or in the section "Analyses of samples at miscellaneous sites".

Laboratory measurements

Sediment samples, samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the U.S. Geological Survey laboratory in Arvada, Colorado and the University of Iowa Hygenic Laboratory. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the U.S. Geological Survey laboratories are given in TWRI, Book 1, Chap. D2, Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, as appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor temperature record, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

Remark Codes

The following remark codes may appear with the water-quality data in this report:

PRINTED OUTPUT	REMARK
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
&	Biological organism estimated as dominant

Records of Ground-Water Levels

Ground-water level data from a network of observation wells in Iowa are published in this report. These data provide a limited historical record of water-level changes in the State's most important aquifers. Locations of the observation wells in this network in Iowa are shown in figure 13. Information about the availability of the data in the water-level files and reports of the U.S. Geological Survey may be obtained from the Iowa District Office (see address on back of title page).

Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensures that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are arranged alphabetically by counties. The site identification number, based on latitude and longitude, for a given well is the 15-digit numeric value that appears in the upper left corner of the station description. The secondary identification number is the local well number, an alphanumeric value, derived from the township, range, and section location of the well (fig. 14).

Water-level records are obtained from direct measurements with a chalked steel tape, electric line, airline, or from the graph of a water-level recorder. The water-level measurements in this report are in feet with reference to land-surface datum. Land-surface datum is a plane that is approximately at land surface at each well. The elevation of the land-surface datum is given in the well description. The height of the measuring point above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (EOM).

Water-level measurements are reported to the nearest hundredth of a foot. Estimates, indicated by an "e" may be reported in tenths of a foot. Adjustments to the water level recorder chart are indicated by an "a". The error of water-level measurements may be, at most, a few hundredths of a foot.

Data Presentation

Each well record consists of two parts, the station description and the table of water levels observed during the water year. The description of the well is presented by headings preceding the tabular data. The following explains the information presented under each heading.

LOCATION.--This paragraph follows the well identification number and includes the latitude and longitude (given in degrees, minutes, and seconds), the hydrologic unit number, the distance and direction from a geographic point of reference, and the well owner's name.

AQUIFER.--This entry is the aquifer(s) name (if one exists) and geologic age of the strata open to the well.

WELL CHARACTERISTICS.--This entry describes the well depth, casing diameter, casing depth, opening or screened interval(s), method of construction, and use of water from the well.

METHOD/INSTRUMENTATION.--This paragraph provides information on the frequency of measurement and the collection method used.

DATUM.--This entry includes the measuring point and the land-surface elevation at the well. The measuring point is described physically and in relation to land surface. The elevation of the land-surface datum is in feet above National Geodetic Vertical Datum of 1929 and its precision is dependent on the method of determination.

REMARKS.--This entry describes factors that may influence the water level in a well or the measurement of the water level and any information not presented in the other parts of the station description but considered useful.

PERIOD OF RECORD.--This entry indicates the period for which there are published records for the well. It reports the month and year of the begining of publication of water-level records by the U.S. Geological Survey.

REVISED RECORDS.--If any revisions of previously published data were made for water-levels, the Water Data Report in which they appeared and year published would appear here.

EXTREMES FOR PERIOD OF RECORD.--This entry contains the highest and lowest water levels for the period of record, below land-surface datum, and the dates of their occurrence.

A table of water levels follows the station description for each well. Water levels are reported in feet below land-surface datum. For wells equipped with recorders, only abbreviated tables are published. The highest and lowest water levels of the water year and the dates of occurence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level.

Hydrographs are included for 83 wells which are representative of hydrologic conditions in the important aquifers in Iowa.

Only water-level data from a national network of observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the Nation's most important aquifers. Locations of the observation wells in this network in Iowa are shown in figure 8.

Records of Ground-Water Quality

Records of ground-water quality in this report differ from other types of records in that for most sampling sites they consist of only one set of measurements for the water year. The quality of ground water ordinarily changes only slowly; therefore, for most general puposes one annual sampling, or only a few samples taken at infrequent intervals during the year, is sufficient. Frequent measurement of the same constituents is not necessary unless one is concerned with a particular problem, such as monitoring for trends in nitrate concentration. In the special cases where the quality of ground water may change more rapidly, more frequent measurements are made to identify the nature of the changes.

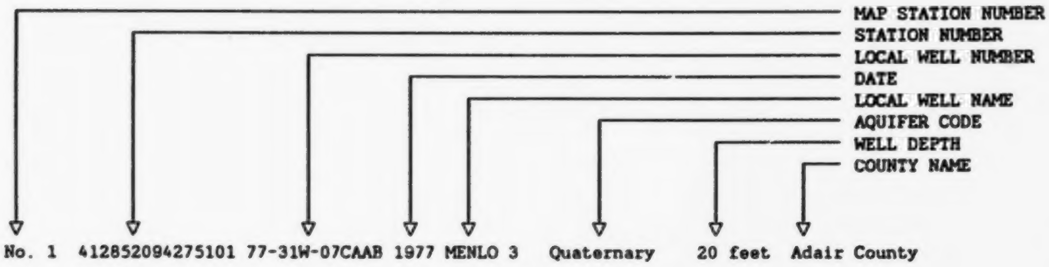
The records of ground-water quality in this report were obtained as a part a statewide ground-water quality monitoring network operated by the Iowa District. All samples were obtained from municipal wells throughout Iowa. This program is conducted in cooperation with the University of Iowa Hygienic Laboratory (UHL) and the Iowa Geological Survey. All samples are collected by USGS personnel, field-preserved and submitted to UHL for analysis. Chemical analyses include common constituents (major ions), nutrients, trace metals, radionuclides and pesticides. Approximately 10 percent of the samples receive additional analyses for about 90 organic priority pollutants, however these analyses are not presented in this report but are on file in the District office.

Most methods for collecting and analyzing water samples are described in the "U.S. Geological Survey Techniques of Water-Resources Investigations" manuals listed on a following page. The values reported in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possible metal, comprising the casings. The samples collected represent raw water

Data Presentation

The records of ground-water quality are published in a section titled GROUND-WATER QUALITY DATA immediately following the ground-water-level records. Data for quality of ground water are listed alphabetically by County, and are identified by station number. The prime identification number for wells sampled is the 15-digit station number derived from the latitude-longitude locations. No descriptive statements are given for ground-water-quality records; however, the station number, date and time of sampling, depth of well, and other pertinent data are given in the table containing the chemical analyses of the ground water. The REMARK codes listed for surface-water-quality records are also applicable to ground-water-quality records.

Explanation of ground-water-quality data tables--descriptive headings


MAP STATION NUMBER
STATION NUMBER
LOCAL WELL NUMBER
DATE
LOCAL WELL NAME
AQUIFER CODE
WELL DEPTH
COUNTY NAME
No. 1 412852094275101 77-31W-07CAAB 1977 MENLO 3 Quaternary 20 feet Adair County

MAP STATION: Reference to illustrations found in "SUMMARY OF
NUMBER HYDROLOGIC CONDITIONS".

STATION: 15-digit number based on grid system of latitude and
NUMBER longitude

LOCAL WELL: Refers to the Bureau of Land Management System of land
NUMBER subdivision

DATE: Date of well construction.

LOCAL WELL NAME: Name used by community to identify well.

AQUIFER: Refers to the lithologic unit in which the well is
CODE completed. Derived from first two digits of the GEOLOGIC UNIT, the principal unit which is providing the majority of water to the well.

11 = Quaternary
21 = Cretaceous
32 = Pennsylvanian
33 = Mississippian
34 = Devonian
35 = Silurian
36 = Ordivician
37 = Cambrian

Third digit and remaining alphabetic characters refer to the more specific lithologic unit which the well is tapping. The following examples are commonly used units:

CODE	General	Specific
111ALVM	Quaternary	(alluvium)
217DKOT	Cretaceous	(Dakota sandstone)
344CDVL	Devonian	(Cedar Valley limestone)

ACCESS TO WATSTORE DATA

The National WATer Data STOrage and REtrieval System (WATSTORE) was established for handling water data collected through the activities of the U.S. Geological Survey and to provide for more effective and efficient means of releasing the data to the public. The system is operated and maintained on the central computer facilities of the Survey at its National Center in Reston, Virginia.

WATSTORE can provide a variety of useful products ranging from simple data tables to complex statistical analyses. A minimal fee, plus the actual computer cost incurred in producing a desired product, is charged to the requester. Information about the availability of specific types of data, the acquisition of data or products, and user charges can be obtained locally from the offices whose addresses are given on the back of the title page.

General inquiries about WATSTORE may be directed to:

Chief Hydrologist
U.S. Geological Survey
437 National Center
Reston, Virginia 22092

DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System (SI) Units on the inside of the back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

> Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5°C plus or minus 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.
>
> Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as Gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C plus or minus 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Bottom material: See Bed material.

Cubic-foot-per-second day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons, or 2,445 cubic meters.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of salt water.

Cubic foot per second (ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge is the discharge at a particular instant of time.

Dissolved refers to that material in a representative water sample which passes through a 0.45 um membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate (CaCO).

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

Land-surface datum (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

Measuring point (MP) is an arbitrary permanent reference point from which the distance to the water surface in a well is measured to obtain the water level.

Micrograms per gram (ug/g) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per liter (UG/L, ug/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represents the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L and is based on the mass of dry sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Parameter Code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentaiton methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual- accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification used in this report agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay..........	0.00024 - 0.004	Sedimentation
Silt..........	.004 - .062	Sedimentation
Sand..........	.062 - 2.0	Sedimentation or sieve
Gravel........	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic matter is removed, and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native-water analysis.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

Picocurie (PC, pCi) is one trillionth (1 x 10) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7 x 10 radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

Runoff in inches (IN., in.) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed and very close to it. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

Bed load discharge (tons per day) is the quantity of bed load measured by dry weight that moves past a section as bed load in a given time.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which dry mass of sediment passes a section of a stream or is the quantity of sediment, as measured by dry mass or volume, that passes a section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge ft^3/s x 0.0027.

Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

Total sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry mass or volume, that passes a section during a given time.

Total-sediment load or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

7-day 10-year low flow (7 Q) is the discharge at the 10-year recurrence interval taken from a frequency curve of annual values of the lowest mean discharge for 7 consecutive days (the 7-day low flow).

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25° C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65-percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and volume of water, per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Surface area of a lake is that area outlined on the latest U.S.G.S. topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

Surficial bed material is the part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95-percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter. This term is used only when the analytical procedure assures measurement of at least 95-percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY) is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95-percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined all of the constituent in the sample.)

Total discharge is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross-section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95-percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

Water year in U.S. Geological Survey reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1989, is called the "1989 water year."

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976).

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WSP is used as an abbreviation for "Water-Supply Paper" in reference to previously published reports.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

1-D1. *Water temperature--influential factors, field measurement, and data presentation*, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.

1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.

2-D1. *Application of surface geophysics to ground-water investigations*, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.

2-D2. *Application of seismic-refraction techniques to hydrologic studies*, by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.

2-E1. *Application of borehole geophysics to water-resources investigations*, by W. S. Keys and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.

2-F1. *Application of drilling, coring, and sampling techniques to test holes and wells*, by Eugene Shuter and Warren E. Teasdale: USGS--TWRI Book 2, Chapter F1. 1989. 97 pages.

3-A1. *General field and office procedures for indirect discharge measurements*, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.

3-A2. *Measurement of peak discharge by the slope-area method*, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.

3-A3. *Measurement of peak discharge at culverts by indirect methods*, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.

3-A4. *Measurement of peak discharge at width contractions by indirect methods*, by H. F. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.

3-A5. *Measurement of peak discharge at dams by indirect methods*, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.

3-A6. *General procedure for gaging streams*, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.

3-A7. *Stage measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3. Chapter A7. 1968. 28 pages.

3-A8. *Discharge measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.

3-A9. *Measurement of time of travel in streams by dye tracing*, by F. A. Kilpatrick and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1989. 27 pages.

3-A10. *Discharge ratings at gaging stations*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.

3-A11. *Measurement of discharge by moving-boat method*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.

3-A12. *Fluorometric procedures for dye tracing*, by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 41 pages.

3-A13. *Computation of continuous records of streamflow*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.

3-A14. *Use of flumes in measuring discharge*, by F. A. Kilpatrick and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.

3-A15. *Computation of water-surface profiles in open channels*, by Jacob Davidian: USGS--TWRI Book 3, Chapter A15. 1984. 48 pages.

3-A16. *Measurement of discharge using tracers*, by F. A. Kilpatrick and E. D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.

3-A17. *Acoustic velocity meter systems*, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.

3-A18. *Determination of stream reaeration coefficients by use of tracers*, by F. A. Kilpatrick, R. E. Rathbun, N. Yotsukura, G. W. Parker, and L. L. DeLong: USGS--TWRI Book 3, Chapter A18. 1989. 52 pages.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

3-B1. *Aquifer-test design, observation, and data analysis*, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.

3-B2. *Introduction to ground-water hydraulics, a programmed text for self-instruction*, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.

3-B3. *Type curves for selected problems of flow to wells in confined aquifers*, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.

3-B5. *Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems--An introduction*, by O. L. Franke, T. E. Reilly, and G. D. Bennett: USGS--TWRI Book 3, Chapter B5. 1987. 15 pages.

3-B6. *The principle of superposition and its application in ground-water hydraulics*, by T. E. Reilly, O. L. Franke, and G. D. Bennett: USGS--TWRI Book 3, Chapter B6. 1987. 28 pages.

3-C1. *Fluvial sediment concepts*, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.

3-C2. *Field methods for measurement of fluvial sediment*, by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.

3-C3. *Computation of fluvial-sediment discharge*, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.

4-A1. *Some statistical tools in hydrology*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.

4-A2. *Frequency curves*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.

4-B1. *Low-flow investigations*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.

4-B2. *Storage analyses for water supply*, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.

4-B3. *Regional analyses of streamflow characteristics*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.

4-D1. *Computation of rate and volume of stream depletion by wells*, by C. T. Jenkins: USGS-TWRI Book 4, Chapter D1. 1970. 17 pages.

5-A1. *Methods for determination of inorganic substances in water and fluvial sediments*, by M. J. Fishman and L. C. Friedman: USGS--TWRI Book 5, Chapter A1. 1989. 545 pages.

5-A2. *Determination of minor elements in water by emission spectroscopy*, by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.

5-A3. *Methods for the determination of organic substances in water and fluvial sediments*, edited by R. L. Wershaw, M. J. Fishman, R. R. Grabbe, and L. E. Lowe: USGS--TWRI Book 5, Chapter A3. 1987. 80 pages.

5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples*, by L. J. Britton and P. E. Greeson, editors: USGS--TWRI Book 5, Chapter A4. 1989. 363 pages.

5-A5. *Methods for determination of radioactive substances in water and fluvial sediments*, by L. L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.

5-A6. *Quality assurance practices for the chemical and biological analyses of water and fluvial sediments*, by L. C. Friedman and D. E. Erdmann: USGS--TWRI Book 5, Chapter A6. 1982. 181 pages.

5-C1. *Laboratory theory and methods for sediment analysis*, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.

6-A1. *A modular three-dimensional finite-difference ground-water flow model*, by M. G. McDonald and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.

7-C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments*, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.

7-C2. *Computer model of two-dimensional solute transport and dispersion in ground water*, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.

7-C3. *A model for simulation of flow in singular and interconnected channels*, by R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.

8-A1. *Methods of measuring water levels in deep wells*, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.

8-A2. *Installation and service manual for U.S. Geological Survey manometers*, by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 pages.

8-B2. *Calibration and maintenance of vertical-axis type current meters*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.

DISCONTINUED GAGING STATIONS

The following stream-gaging stations have been discontinued in Iowa. Continuous daily streamflow records were collected and published for the period of record shown for each station.

Discontinued gaging stations

Station name	Station number	Drainage area (sq mi)	Period of record
Upper Iowa River at Decorah, Iowa	05387500	511	1952-83
Upper Iowa River near Decorah, Iowa	05388000	568	1913-14; 1919-27; 1933-51
Paint Creek at Waterville, Iowa	05388500	42.8	1952-73
Yellow River at Ion, Iowa	05389000	221	1934-51
Mississippi River at Clayton, Iowa	05411500	9,200	1930-36
Turkey River at Elkader, Iowa	05412000	891	1932-42
Little Maquoketa River near Durango, Iowa	05414500	130	1934-82
Maquoketa River near Manchester, Iowa	05417000	305	1933-73
Maquoketa River near Delhi, Iowa	05417500	347	1933-40
Bear Creek near Monmouth, Iowa	05417700	61.3	1957-76
Maquoketa River above North Fork Maquoketa River near Maquoketa, Iowa	05418000	938	1913-14
Wapsipinicon River at Stone City, Iowa	05421500	1,324	1903-14
Crow Creek at Eldridge, Iowa	05422420	2.20	1977-82
Crow Creek at Mt. Joy, Iowa	05422450	6.90	1977-82
Pine Creek at Muscatine, Iowa	05448150	38.9	1975-82
Eagle Lake inlet near Britt, Iowa	05448285	3.83	1975-80
Eagle Lake outlet near Britt, Iowa	05448290	11.3	1975-80
West Branch (West Fork) Iowa River near Klemme, Iowa	05448500	112	1948-58
Iowa River near Iowa Falls, Iowa	05450000	665	1911-14
Upper Pine Lake at Eldora, Iowa	05450500	14.9	1936-70
Lower Pine Lake at Eldora, Iowa	05451000	15.9	1936-70
Iowa River near Belle Plaine, Iowa	05452500	2,455	1939-59
Lake Macbride near Solon, Iowa	05453500	27.0	1936-71
Ralston Creek at Iowa City, Iowa	05455000	3.01	1924-87
Cedar River at Mitchell, Iowa	05457500	826	1933-42
Shell Rock River near Northwood, Iowa	05459000	300	1945-86
Shell Rock River at Marble Rock (Greene), Iowa	05460500	1,318	1933-53
Shell Rock River at Greene, Iowa	05461000	1,357	1933-42
Shell Rock River near Clarksville, Iowa	05461500	1,626	1915-27; 1932-34
Fourmile Creek near Lincoln, Iowa	05464130	13.78	1962-67; 1969-74
Half Mile Creek near Gladbrook, Iowa	05464133	1.33	1962-67; 1969-74
Fourmile Creek near Traer, Iowa	05464137	19.51	1962-74; 1975-80
Prairie Creek at Fairfax, Iowa	05464640	178	1966-82
South Skunk River below Squaw Creek near Ames, Iowa	05471000	556	1952-79
Lake Keomah near Oskaloosa, Iowa	05472000	3.06	1936-71
Skunk River at Coppock, Iowa	05473000	2,916	1913-44
Big Creek near Mount Pleasant, Iowa	05473500	106	1955-79
East Fork Des Moines River near Burt, Iowa	05478000	462	1971-74
East Fork Des Moines River near Hardy, Iowa	05478500	1,268	1940-54
Des Moines River near Fort Dodge, Iowa	05479500	3,753	1911-13
Lizard Creek near Clare, Iowa	05480000	257	1940-82
Des Moines River near Boone, Iowa	05481500	5,511	1920-68
Des Moines River at Des Moines, Iowa	05482000	6,245	1905-06; 1915-61
Storm Lake at Storm Lake, Iowa	05482140	28.3	1970-75
Springbrook Lake near Guthrie Center, Iowa	05483500	5.18	1936-71
Raccoon River at Des Moines, Iowa	05485000	3,590	1902-03
Lake Ahquabi near Indianola, Iowa	05487000	4.93	1936-71
White Breast Creek near Knoxville, Iowa	05488000	380	1945-62
Muchakinock Creek near Eddyville, Iowa	05489190	70.2	1975-79
Lake Wapello near Drakesville, Iowa	05490000	7.75	1936-71
Sugar Creek near Keokuk, Iowa	05491000	105	1922-31; 1958-73
Fox River at Bloomfield, Iowa	05494300	87.7	1957-73
Fox River at Cantril, Iowa	05494500	161	1940-51
Rock River at Rock Rapids, Iowa	06483270	788	1959-74
Dry Creek at Hawarden, Iowa	06484000	48.4	1948-69
West Fork ditch at Holly Springs, Iowa	06602000	399	1939-69
Loon Creek near Orleans, Iowa	06603920	31	1971-74
Spirit Lake outlet at Orleans, Iowa	06604100	75.6	1971-74
Milford Creek at Milford, Iowa	06604400	146	1971-74
Little Sioux River at Spencer, Iowa	06605100	990	1936-42
Little Sioux River at Gillett Grove, Iowa	06605600	1,334	1958-73
Little Sioux River near Kennebeck, Iowa	06606700	2,738	1939-69
Odebolt Creek near Arthur, Iowa	06607000	39.3	1957-75
Maple River at Turin, Iowa	06607300	725	1939-41
Little Sioux River near Blencoe (Turin), Iowa	06607510	4,470	1939-42
Steer Creek near Magnolia, Iowa	06609200	9.26	1963-69
Thompson Creek near Woodbine, Iowa	06609590	6.97	1963-69
Willow Creek near Logan, Iowa	06609600	129	1972-75
Indian Creek at Council Bluffs, Iowa	06610500	7.99	1954-76
Mosquito Creek near Earling, Iowa	06610520	32.0	1965-79
Waubonsie Creek near Bartlett, Iowa	06806000	30.4	1946-69
West Nishnabotna River at Harlan, Iowa	06807320	316	1977-82
West Nishnabotna River at (near) White Cloud, Iowa	06807500	967	1918-24
Mule Creek near Malvern, Iowa	06808000	10.6	1954-69
Spring Valley Creek near Tabor, Iowa	06808200	7.6	1955-64
Davids Creek near Hamlin, Iowa	06809000	26.0	1952-73
Tarkio river at Blanchard, Iowa	06812000	200	1934-40
West Nodaway River at Villisca, Iowa	06816500	342	1918-25
Honey Creek near Russell, Iowa	06903500	13.2	1952-62
Chariton River near Centerville, Iowa	06904000	708	1938-59

DISCONTINUED WATER-QUALITY STATIONS

The following water-quality stations have been discontinued in Iowa. Continuous daily records of water temperature or sediment and monthly or periodic samples of chemical quality were collected and published for the period of record shown for each station. An asterisk (*) in the type of record column indicates that periodic data is available for that parameter subsequent to the period of daily record.

Discontinued water-quality stations

Station name	Station number	Drainage area (sq mi)	Type of Record	Period of record
Upper Iowa River at Decorah, Iowa	05387500	511	Sed., Temp.	1963-1983
Upper Iowa River near Dorchester, Iowa	05388250	770	Sed., Temp.	1975-81
Paint Creek at Waterville, Iowa	05388500	42.8	Temp.	1952-56
			Sed.	1952-57
Turkey River at Garber, Iowa	05412500	1,545	Temp., Sed.*	1957-62
Mississippi River at Dubuque, Iowa	05414700	1,600	Chem.	1969-73
Maquoketa River near Maquoketa, Iowa	05418500	1,553	Chem., Temp., Sed.	1978-82
Mississippi River at Clinton, Iowa	05420500	85,600	Chem.	1973-87
Wapsipinicon River at Independence, Iowa	05421000	1,048	Chem.*	1968-70
			Temp.*, Sed.*	1967-70
Crow Creek at Bettendorf, Iowa	05422470	17.8	Chem., Temp., Sed.	1978-82
Iowa River near Rowan, Iowa	05449500	429	Temp.*, Sed.*	1957-62
Cedar River near Gilbertville, Iowa	05464020	5,234	Chem.	1971; 1975-81
Iowa River at Iowa City, Iowa	05454500	3,271	Chem., Temp., Sed.	1952-1987
Ralston Creek at Iowa City, Iowa	05455000	3.01	Chem., Temp., Sed.	1906-1907; 1944-88
Fourmile Creek near Lincoln, Iowa	05464130	13.78	Chem., Temp., Sed.	1969-74
Half Mile Creek near Gladbrook, Iowa	05464133	1.33	Chem., Temp., Sed.	1969-74
Fourmile Creek near Traer, Iowa	05464137	19.51	Chem., Temp., Sed.	1969-74
Cedar River near Palo, Iowa	05464450	6,380	Chem.	1975-79
Cedar River at Cedar Rapids, Iowa	05464500	6,640	Chem.*	1906-07; 1944-54
			Temp.*	1944-54
			Sed.	1943-54
Cedar River near Bertram, Iowa	05464760	6,955	Chem.	1975-81
Mississippi River at Burlington, Iowa	05469720	4,000	Chem.	1969-73
Mississippi River at Keokuk, Iowa	05474500	119,000	Chem.	1974-87
Des Moines River at Fort Dodge, Iowa	05480500	4,190	Chem.	1972-73
Des Moines River at Des Moines, Iowa	05482000	6,245	Chem.	1954-55
			Temp., Sed.	1954-61
E. Fork Hardin Creek near Churdan, Iowa	05483000	24.0	Temp.*,Sed.*	1952-57
M. Fork Raccoon River near Bayard, Iowa	05483450	375	Chem.,Temp., Sed.	1979-85
M. Fork Raccoon River at Panora, Iowa	05483600	440	Chem.,Temp., Sed.	1979-85
Raccoon River at Des Moines, Iowa	05485000	3,590	Chem., Temp.	1945-47
Des Moines River below Raccoon River at Des Moines, Iowa	05485500	9,770	Chem.*	1944-45
			Temp.*, Sed.	1944-47
Des Moines River below Des Moines, Iowa	05485520	9,901	Chem.	1971; 1975-81
Middle River near Indianola, Iowa	05486490	503	Temp.*, Sed.	1962-67
White Breast Creek near Dallas, Iowa	05487980	342	Chem.	1968-73
			Temp., Sed.	1967-73
Big Sioux River at Sioux City, Iowa	06485950	9,410	Chem.	1969-73
Missouri River at Sioux City, Iowa	06486000	314,600	Chem.	1972-86
Floyd River at James, Iowa	06600500	882	Temp., Sed.	1968-73
Floyd River at Sioux City, Iowa	06600520	921	Chem.	1969-73
Missouri River at Decatur, Nebr.	06601200	316,160	Chem.	1974-81
Little Sioux River at Correctionville, Iowa	06606600	2,500	Chem.*	1954-55
			Temp.*	1951-62
			Sed.	1950-62
Little Sioux River near Kennebec, Iowa	06606700	2,738	Temp.	1950-55
			Sed.	1950-57
Little Sioux River at River Sioux, Iowa	06607513	3,600	Chem.	1969-73
Soldier River near Mondamin, Iowa	06608505	440	Chem.	1970-73
Steer Creek near Magnolia, Iowa	06609200	9.26	Temp., Sed.	1963-69
Thompson Creek near Woodbine, Iowa	06609590	6.97	Temp., Sed.	1963-69
Willow Creek near Logan, Iowa	06609600	129	Chem., Temp.	1972-75
			Sed.	1971-75
Missouri River at Omaha, Nebr.	06610000	322,800	Chem.	1969-86
Mule Creek near Malvern, Iowa	06808000	10.6	Temp.	1958-69
			Sed.	1954-69
Davids Creek near Hamlin, Iowa	06809000	26.0	Temp.*	1952-53; 1965-68
East Nishnabotna River at Red Oak, Iowa	06809500	894	Temp., Sed.	1962-73
Platte River near Diagonal, Iowa	06818750	217	Chem.	1969-73
Thompson River at Davis City, Iowa	06898000	701	Chem.	1967-73
			Temp., Sed.	1968-73
Weldon River near Leon, Iowa	06898400	104	Chem.	1968-73
Chariton River near Chariton, Iowa	06903400	182	Temp., Sed.	1969-73
Honey Creek near Russell, Iowa	06903500	13.2	Sed.	1952-62
Chariton River near Rathbun, Iowa	06903900	551	Temp.*, Sed.*	1962-69

Type of record: Chem. (chemical quality); Temp. (water temperature); Sed. (sediment).

UPPER IOWA RIVER BASIN

05388250 UPPER IOWA RIVER NEAR DORCHESTER, IA

LOCATION.--Lat 43°25'16", long 91°30'31", in SW1/4 NW1/4 sec.1, T.99 N., R.6 W., Allamakee County, Hydrologic Unit 07060002, on right bank at upstream side of bridge on State Highway 76, 650 ft upstream from Mineral Creek, 0.5 mi upstream from Bear Creek, 3.5 mi south of Dorchester, and 18.1 mi upstream from mouth.

DRAINAGE AREA.--770 mi^2.

PERIOD OF RECORD.--September 1936 to June 1975 (gage heights and discharge measurements only), July 1975 to current year.

GAGE.--Water-stage recorder. Datum of gage is 660.00 ft above NGVD. Prior to Jan. 6, 1938, nonrecording gage on old bridge at site 0.2 mi upstream at datum 5.91 ft higher. Jan. 6, 1938, to Apr. 26, 1948, nonrecording gage at datum 60.00 ft lower, Apr. 27, 1948 to August 1963, nonrecording gage on old bridge and August 1963 to June 1975 nonrecording gage on new bridge at same datum.

REMARKS.--Estimated daily discharges: Nov. 29 to Mar. 12 and Sept. 4-6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Geological Survey gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--14 years, (water years 1976-89) 551 ft^3/s, 9.72 in/yr, 399,200 acre-ft/yr; median of yearly mean discharges, 510 ft^3/s, 9.0 in/yr, 369,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,000 ft^3/s Mar. 12, 1976, gage height, 17.67 ft; minimum daily discharge, 79 ft^3/s Dec. 31, 1976.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 30, 1941, reached a stage of 21.8 ft, from flood profile, discharge, 30,400 ft^3/s on basis of slope-area determination of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	0430	4,900	(a) *14.50	Mar. 14	2107	*5,550	13.14

(a) Ice jam
Minimum daily discharge, 80 ft^3/s Feb. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	146	128	110	115	250	110	307	445	287	137	115	166
2	138	128	120	115	150	105	283	405	271	135	99	248
3	134	126	130	110	90	100	269	369	235	133	101	250
4	129	129	140	110	80	110	257	346	210	130	100	198
5	127	135	150	105	100	140	249	335	194	125	129	183
6	125	133	140	115	140	120	235	313	181	123	140	173
7	123	130	135	120	180	110	244	297	174	121	116	171
8	123	129	130	125	160	120	235	283	170	115	105	171
9	124	127	125	115	140	130	219	272	168	117	99	171
10	124	126	120	110	145	170	209	263	165	115	99	164
11	124	124	115	115	150	300	204	249	157	122	97	160
12	120	128	110	115	160	1500	197	237	152	122	95	160
13	118	133	115	110	165	2750	190	230	156	116	96	168
14	120	131	120	115	140	3230	186	226	148	112	97	168
15	123	133	110	120	130	3460	181	222	146	110	100	166
16	126	156	100	115	120	1470	178	215	145	107	101	166
17	126	154	96	120	110	1060	175	211	140	103	99	163
18	128	156	105	125	115	495	171	208	135	111	98	159
19	127	151	115	120	110	428	169	210	130	124	96	151
20	128	151	130	125	100	379	168	215	127	130	99	147
21	136	145	125	120	96	375	168	213	123	120	103	141
22	133	139	130	125	100	358	168	204	123	127	112	143
23	133	132	135	125	90	894	193	200	120	125	108	145
24	133	142	140	130	100	1980	252	199	125	120	104	141
25	131	140	130	130	110	1460	285	203	141	115	102	130
26	128	143	125	125	130	1050	272	270	153	107	98	127
27	130	147	120	125	120	795	284	275	152	114	101	125
28	129	142	115	140	115	604	338	237	142	105	133	123
29	126	140	115	170	---	478	413	218	140	107	170	121
30	126	130	110	190	---	399	444	214	140	122	195	120
31	127	---	120	210	---	348	---	294	---	123	156	---
TOTAL	3965	4108	3781	3910	3596	25028	7143	8078	4850	3693	3463	4819
MEAN	128	137	122	126	128	807	238	261	162	119	112	161
MAX	146	156	150	210	250	3460	444	445	287	137	195	250
MIN	118	124	96	105	80	100	168	199	120	103	95	120
AC-FT	7860	8150	7500	7760	7130	49640	14170	16020	9620	7330	6870	9560
CFSM	.17	.18	.16	.16	.17	1.05	.31	.34	.21	.15	.15	.21
IN.	.19	.20	.18	.19	.17	1.21	.35	.39	.23	.18	.17	.23

CAL YR 1988 TOTAL 93003 MEAN 254 MAX 1600 MIN 96 AC-FT 184500 CFSM .33 IN. 4.49
WTR YR 1989 TOTAL 76434 MEAN 209 MAX 3460 MIN 80 AC-FT 151600 CFSM .27 IN. 3.69

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA

LOCATION.--Lat 43°01'29", long 91°10'21", in SE1/4 SE1/4 sec.22, T.95 N., R.3 W., Clayton County, Hydrologic Unit 07060001, on right bank in city park at east end of Main Street in McGregor, 2.6 mi upstream from Wisconsin River, 4.3 mi downstream from Yellow River, and at mile 633.4 upstream from Ohio River.

DRAINAGE AREA.--67,500 mi^2, approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1936 to current year.

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 604.84 ft above NGVD. Prior to June 1, 1937, and since June 2, 1939, auxiliary water-stage recorder; June 1, 1937 to June 1, 1939, auxiliary nonrecording gage 14.1 mi upstream in tailwater of dam 9, at datum 5.30 ft lower.

REMARKS.--Estimated daily discharges: Dec. 11 to Jan. 30, and Feb. 2 to Mar. 22. Records good except those for estimated daily discharges and for discharges less than 10,000 ft^3/s, which are fair. Stage-discharge relation affected by backwater from Wisconsin River and Lock and Dam No. 10. Minor flow regulation caused by navigation dams. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--53 years, 35,300 ft^3/s, 7.10 in/yr, 25,570,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 276,000 ft^3/s Apr. 24, 1965; maximum gage height, 25.38 ft Apr. 24, 1965; minimum daily discharge, 6,200 ft^3/s Dec. 9, 1936; minimum gage height, -0.86 ft Aug. 18, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1828, that of Apr. 24, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 103,000 ft^3/s Apr. 2; maximum gage height, 13.85 ft Apr. 3,4; minimum daily discharge, 9,310 ft^3/s Aug. 15; minimum gage height, 5.90 ft Oct. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19900	14400	19500	17100	16900	14500	98700	42800	50200	27700	12800	16600
2	21400	16100	18900	16000	16500	14600	103000	42600	51500	27300	14400	18800
3	23200	15700	18900	15100	15700	14900	102000	42700	53500	25800	16400	18500
4	23600	16400	19500	14800	16000	15000	98700	43100	59600	24300	16400	17200
5	20600	18100	20700	14900	16300	14900	93200	46100	65700	23900	17600	18900
6	16300	20000	21600	14100	16500	14800	86600	46800	66700	24100	18200	23200
7	16100	19900	20900	14200	16500	14600	80500	47100	59800	24000	18100	26800
8	17000	18800	20000	13900	16400	14500	76300	46700	48900	23100	15800	28400
9	17300	17800	19100	13300	16200	14400	71900	46300	39900	21800	11900	29600
10	17800	17200	18100	13400	15900	14300	67000	45300	35200	21100	11000	29300
11	18200	17400	14700	13500	15800	15400	68200	44000	30500	20500	9740	26900
12	17000	16300	13000	13400	17000	18800	70200	43200	26200	19500	9620	23900
13	15900	16100	11100	13400	16900	27800	71100	42700	22000	18100	9650	20100
14	16100	16200	10500	13400	16800	35200	72000	42300	18800	16900	9340	16700
15	15000	16900	10700	13500	16800	46500	71200	41200	16900	16400	9310	14100
16	15200	19700	10500	13800	16900	45700	68900	40400	17700	15300	10700	12700
17	14700	20600	10900	14000	17300	44200	65700	39500	20900	14600	13000	12600
18	14800	22800	11800	14100	17300	36500	61300	37900	28300	13500	14900	13800
19	14300	23700	13000	14200	17200	30000	56100	36300	33000	14000	15500	13700
20	14900	24500	14500	14400	17200	24900	51800	35700	34200	14100	16000	14300
21	15800	25400	16700	14300	17200	20000	50400	34700	34100	15500	17000	15300
22	17000	26500	17000	14300	17200	16000	50700	31900	31200	16400	18400	15700
23	16700	27200	16800	14400	17200	17600	51500	29500	26200	16600	18600	16600
24	16500	27400	17100	14700	16400	18300	51300	28300	22500	17100	18100	17200
25	16300	26200	17100	14700	15700	26300	50900	28000	20300	17400	17100	16100
26	15700	25200	17200	14900	15100	40200	49300	30500	18800	17000	16300	15500
27	15400	24500	17700	14900	14400	56200	46800	33200	19300	15600	15600	16300
28	14500	21700	19000	15500	14400	68200	45800	35100	21800	14200	16600	16400
29	14500	19900	18500	15900	---	77400	45400	38100	24400	13700	17000	15600
30	14900	19700	18100	16400	---	82400	44500	40900	26000	12400	16200	16200
31	14700	---	17900	18300	---	90800	---	47000	---	12000	15800	---
TOTAL	521300	612300	511000	452800	459700	984900	2021000	1229900	1024100	573900	457060	557000
MEAN	16820	20410	16480	14610	16420	31770	67370	39670	34140	18510	14740	18570
MAX	23600	27400	21600	18300	17300	90800	103000	47100	66700	27700	18600	29600
MIN	14300	14400	10500	13300	14400	14300	44500	28000	16900	12000	9310	12600
AC-FT	1034000	1214000	1014000	898100	911800	1954000	4009000	2440000	2031000	1138000	906600	1105000
CFSM	.25	.30	.24	.22	.24	.47	1.00	.59	.51	.27	.22	.28
IN.	.29	.34	.28	.25	.25	.54	1.11	.68	.56	.32	.25	.31

CAL YR 1988 TOTAL 7571670 MEAN 20690 MAX 57200 MIN 8990 AC-FT 15020000 CFSM .31 IN. 4.17
WTR YR 1989 TOTAL 9404960 MEAN 25770 MAX 103000 MIN 9310 AC-FT 18650000 CFSM .38 IN. 5.18

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples collected by boat 1.5 mi downstream from discharge station. Prior to April 1981, at bridge on U.S. Highway 18, 1.2 mi upstream from gage.

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: July 1975 to current year.
WATER TEMPERATURES: July 1975 to current year.
SUSPENDED-SEDIMENT DISCHARGE: July 1975 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 2350 mg/L Mar. 19, 1986; minimum daily mean, 1 mg/L Dec. 23-25, 1976, Dec. 20, 28, 1977, Feb. 13-17, 23, Mar. 5-9, 1986, Dec. 2, 6, 8-11, 1987, Dec. 26, 1988 to Jan. 4, 1989, Jan. 9-11, and Feb. 20, 21, 1989.
SEDIMENT LOADS: Maximum daily, 363,000 tons Mar. 19, 1986; minimum daily, 31 tons Dec. 25, 1976.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 193 mg/L May 17; minimum daily mean, 1 mg/L Dec. 26 to Jan. 4, Jan. 9-11, and Feb. 20, 21.
SEDIMENT LOADS: Maximum daily, 20,600 tons May. 17; minimum daily, 36 tons Jan. 9-11.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	385	---	---	385	---	---	---	---	---	---	---
2	360	---	350	405	---	---	---	---	---	---	360	---
3	---	---	---	---	415	450	310	---	---	345	---	---
4	---	380	---	---	---	---	---	355	315	---	370	---
5	---	---	355	395	---	---	---	---	305	---	---	---
6	395	---	---	---	405	480	320	---	---	---	---	345
7	---	---	---	---	---	---	---	340	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	385	370	415	---	---	---	---	---	340	360	350
10	410	---	---	---	430	460	---	335	---	335	---	---
11	---	---	---	---	---	425	---	---	320	---	365	360
12	---	405	390	---	---	---	330	---	---	---	---	365
13	---	---	---	420	450	380	---	---	---	330	---	350
14	405	---	---	---	---	---	---	---	---	---	340	---
15	---	405	---	---	---	395	315	330	---	---	---	365
16	---	---	---	---	---	---	---	---	325	---	---	---
17	---	400	380	---	440	405	345	---	---	340	350	---
18	395	---	---	---	---	---	---	325	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	365
20	---	---	380	---	425	380	355	345	---	340	---	---
21	420	390	---	---	---	---	---	---	320	---	---	---
22	---	---	---	---	---	---	---	---	---	---	360	---
23	---	---	---	425	---	---	---	---	---	---	---	---
24	---	---	390	---	410	410	340	345	320	325	---	370
25	400	380	---	---	---	---	---	---	320	---	365	---
26	380	---	395	---	---	---	---	---	---	---	---	---
27	---	---	---	430	430	375	340	---	---	---	345	---
28	---	380	---	---	---	---	---	---	295	---	---	---
29	---	---	405	---	---	---	---	330	310	345	---	385
30	---	---	---	410	---	---	355	---	---	---	---	---
31	---	---	---	---	---	320	---	---	---	370	350	---

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.0	6.0	---	---	---	---	---	---	---	---	---	---
2	---	---	1.0	.0	---	---	---	---	---	---	---	---
3	---	---	---	---	---	.0	5.0	---	---	29.0	---	---
4	---	5.0	---	---	---	---	---	14.0	20.0	---	26.0	---
5	---	---	1.0	---	---	---	---	---	20.0	---	---	---
6	9.0	---	---	.0	---	.0	7.0	---	---	---	---	22.0
7	---	---	---	---	---	---	---	15.0	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	5.0	.0	---	---	---	---	---	---	29.0	27.0	25.0
10	11.0	---	---	---	.0	1.0	---	15.0	---	27.0	---	---
11	---	---	---	---	---	2.0	---	---	20.0	---	25.5	20.0
12	---	4.5	.0	---	---	---	10.0	---	---	---	---	20.0
13	---	---	---	---	.0	1.0	---	---	---	29.0	---	---
14	11.0	---	---	---	---	---	---	---	---	---	24.0	---
15	---	4.0	---	---	---	1.0	10.0	15.0	---	---	---	17.0
16	---	---	.0	---	---	---	---	---	20.0	---	---	---
17	---	4.0	---	---	.0	.0	11.0	---	---	28.0	26.0	---
18	9.0	---	---	---	---	---	---	18.0	---	---	---	--
19	---	---	.0	---	---	---	---	---	---	---	---	23.0
20	---	---	---	---	.0	.0	11.0	18.0	---	28.0	---	---
21	9.0	4.0	---	---	---	---	---	---	21.0	---	---	---
22	---	---	---	---	---	---	---	---	---	---	25.0	---
23	---	---	1.0	---	---	---	---	---	---	---	---	---
24	---	---	---	---	.0	4.0	12.0	19.0	24.0	29.0	---	14.0
25	8.0	3.0	---	---	---	---	---	---	25.0	---	26.0	---
26	8.0	---	.0	---	---	---	---	---	---	---	---	---
27	---	---	---	---	.0	4.0	15.0	---	---	---	24.0	---
28	---	3.0	---	---	---	---	---	---	---	---	---	---
29	---	---	.0	---	---	---	---	20.0	24.0	29.0	---	14.0
30	---	---	1.0	---	---	---	14.0	---	---	---	---	---
31	---	---	---	---	---	6.0	---	---	---	26.0	24.0	---

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	22	1180	42	1630	7	369	1	46	42	1920	3	117
2	22	1270	39	1700	7	357	1	43	25	1110	3	118
3	21	1320	43	1820	6	306	1	41	4	170	2	80
4	18	1150	31	1370	5	263	1	40	3	130	2	81
5	17	946	29	1420	5	279	2	80	3	132	2	80
6	15	660	27	1460	4	233	3	114	4	178	3	120
7	13	565	25	1340	4	226	2	77	4	178	3	118
8	18	826	24	1220	4	216	2	75	4	177	3	117
9	22	1030	23	1110	3	155	1	36	4	175	4	156
10	20	961	22	1020	3	147	1	36	4	172	12	463
11	21	1030	21	987	3	119	1	36	3	128	51	2120
12	21	964	40	1760	4	140	2	72	3	138	78	3960
13	22	944	35	1520	4	120	2	72	2	91	97	7280
14	38	1650	25	1090	3	85	2	72	2	91	135	12800
15	35	1420	18	821	3	87	2	73	2	91	152	19100
16	29	1190	18	957	2	57	3	112	2	91	105	13000
17	23	913	18	1000	2	59	4	151	2	93	30	3580
18	18	719	17	1050	2	64	4	152	2	93	27	2660
19	15	579	16	1020	2	70	4	153	2	93	29	2350
20	14	563	15	992	2	78	4	156	1	46	29	1950
21	14	597	13	892	2	90	4	154	1	46	29	1570
22	43	1970	13	930	2	92	4	154	2	93	28	1210
23	54	2430	14	1030	2	91	4	156	2	93	27	1280
24	47	2090	15	1110	2	92	4	159	2	89	25	1240
25	28	1230	15	1060	2	92	3	119	2	85	30	2130
26	22	933	12	816	1	46	3	121	2	82	37	4020
27	29	1210	10	661	1	48	2	80	2	78	43	6520
28	24	940	8	469	1	51	2	84	3	117	42	7730
29	23	900	7	376	1	50	2	86	---	---	40	8360
30	22	885	7	372	1	49	2	89	---	---	39	8680
31	33	1310	---	---	1	48	4	198	---	---	36	8830
TOTAL	---	34375	---	33003	---	4179	---	3037	---	5980	---	121820

05389500 MISSISSIPPI RIVER AT MCGREGOR, IA--Continued

WATER-QUALITY RECORDS

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	30	7990	32	3700	41	5560	36	2690	28	968	25	1120
2	24	6670	28	3220	56	7790	44	3240	34	1320	20	1020
3	18	4960	32	3690	28	4040	38	2650	38	1680	26	1300
4	18	4800	43	5000	20	3220	35	2300	42	1860	33	1530
5	18	4530	52	6470	15	2660	34	2190	59	2800	23	1170
6	22	5140	42	5310	15	2700	31	2020	74	3640	32	2000
7	34	7390	29	3690	28	4520	29	1880	73	3570	55	3980
8	38	7830	29	3660	72	9510	34	2120	55	2350	39	2990
9	38	7380	31	3880	112	12100	47	2770	35	1120	32	2560
10	37	6690	32	3910	65	6180	44	2510	30	891	33	2610
11	37	6810	42	4990	31	2550	37	2050	41	1080	34	2470
12	37	7010	28	3270	30	2120	44	2320	49	1270	37	2390
13	33	6340	92	10600	30	1780	42	2050	43	1120	40	2170
14	29	5640	123	14000	29	1470	35	1600	30	757	40	1800
15	26	5000	153	17000	28	1280	34	1510	25	628	35	1330
16	25	4650	180	19600	27	1290	43	1780	20	578	25	857
17	28	4970	193	20600	26	1470	82	3230	24	842	24	816
18	31	5130	138	14100	25	1910	150	5470	33	1330	32	1190
19	32	4850	63	6170	25	2230	144	5440	41	1720	49	1810
20	34	4760	29	2800	25	2310	86	3270	50	2160	62	2390
21	33	4490	22	2060	25	2300	72	3010	55	2520	68	2810
22	33	4520	20	1720	25	2110	53	2350	46	2290	73	3090
23	33	4590	22	1750	25	1770	40	1790	43	2160	65	2910
24	33	4570	25	1910	25	1520	27	1250	42	2050	52	2410
25	32	4400	25	1890	23	1260	28	1320	39	1800	50	2170
26	36	4790	24	1980	22	1120	27	1240	34	1500	77	3220
27	48	6070	24	2150	20	1040	26	1100	32	1350	111	4890
28	44	5440	23	2180	30	1770	26	1070	45	2020	142	6290
29	46	5640	23	2370	40	2640	46	1700	60	2750	157	6610
30	35	4210	22	2430	40	2810	43	1440	64	2800	133	5820
31	---	---	18	2280	---	---	25	810	41	1750	---	---
TOTAL	---	167260	---	178380	---	95030	---	70170	---	54674	---	77723
YEAR		845631										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 13...	1205	13.0	25900	21	1470	88
APR 07...	1305	8.0	76900	38	7890	96
MAY 11...	1135	17.0	46800	42	5310	98
JUN 28...	1130	27.5	19600	30	1590	94
AUG 02...	1100	27.0	12900	33	1150	97
SEP 13...	1200	21.0	18700	43	2170	99

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAM-PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
OCT 13...	1150	6	7	10	28	77	87	92	97	100	--
APR 07...	1340	3	1	3	19	85	98	99	100	--	--
MAY 11...	1225	2	--	0	10	76	97	99	100	--	--
JUN 28...	1130	1	1	1	11	64	88	95	99	100	--
AUG 02...	1100	2	1	3	42	97	100	98	99	100	--
SEP 13...	1200	5	5	11	38	82	93	96	98	99	100

05411600 TURKEY RIVER AT SPILLVILLE, IA

LOCATION.--Lat 43°12'28", long 91°56'56", in SW1/4 NE1/4 sec.19, T.97 N., R.9 W., Winneshiek County, Hydrologic Unit 07060004, on right bank 60 ft downstream from bridge on county highway W14 at north edge of Spillville, 150 ft downstream from old mill dam, 0.6 mi upstream from Wonder Creek and at mile 98.5.

DRAINAGE AREA.--177 mi^2.

PERIOD OF RECORD.--June 1956 to September 1973, October 1977 to current year. Monthly discharge only for some periods, published in WSP 1728.

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 1,034.92 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 26-30, Nov. 21-23, and Nov. 28 to Mar. 31. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--29 years, 122 ft^3/s, 9.36 in/yr, 88,390 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,600 ft^3/s July 12, 1972, gage height, 16.73 ft; minimum daily discharge, 4.4 ft^3/s Feb. 1-3, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 18.4 ft, from floodmark, discharge, about 10,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	0115	*800	(a) *9.61				

(a) Ice jam
Minimum discharge, 6.4 ft^3/s Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	14	11	11	30	13	47	76	50	12	7.6	37
2	15	13	12	10	18	12	45	65	38	12	7.6	32
3	15	14	13	10	12	12	40	58	32	12	7.8	32
4	14	14	14	9.5	8.0	13	37	55	29	11	9.1	28
5	15	15	15	9.0	10	15	34	52	25	10	19	24
6	14	14	14	10	13	14	32	51	23	9.8	12	21
7	14	13	13	11	17	13	31	47	21	9.5	10	20
8	15	13	12	12	14	14	30	45	21	9.4	9.3	19
9	14	13	11	13	12	15	29	45	20	9.3	8.6	19
10	14	12	10	12	13	16	28	40	19	8.9	8.1	19
11	12	12	9.5	11	14	100	27	39	19	11	7.8	17
12	13	13	9.0	11	15	450	26	36	19	10	7.6	17
13	13	14	9.5	11	16	300	26	34	18	9.2	7.8	17
14	13	14	10	12	14	400	25	33	18	8.7	7.9	15
15	12	14	9.5	12	13	230	24	31	17	8.7	7.5	14
16	12	19	9.0	13	12	120	24	30	16	8.8	7.3	13
17	13	19	8.5	13	12	90	24	27	15	8.7	7.1	12
18	13	18	9.0	14	13	74	23	27	14	12	6.8	12
19	13	17	10	14	13	66	24	28	14	11	7.1	11
20	14	16	11	13	12	64	25	28	13	10	7.9	11
21	15	15	11	13	11	61	25	26	12	10	7.1	11
22	16	14	12	14	12	60	27	25	12	9.8	7.0	12
23	15	15	13	15	11	120	42	24	14	9.6	7.4	11
24	14	16	13	14	13	240	76	24	14	9.9	7.3	11
25	15	15	12	14	15	160	73	25	14	9.7	7.0	11
26	14	16	12	13	16	120	59	25	17	8.6	7.4	10
27	15	16	11	14	15	96	53	24	16	7.9	7.6	10
28	15	15	11	14	14	80	58	23	14	7.7	12	10
29	16	11	10	15	---	64	103	23	13	7.9	14	10
30	16	10	10	18	---	56	101	25	13	8.4	11	10
31	15	---	10	23	---	52	---	29	---	8.0	13	---
TOTAL	439	434	345.0	398.5	388.0	3140	1218	1120	580	299.5	274.7	496
MEAN	14.2	14.5	11.1	12.9	13.9	101	40.6	36.1	19.3	9.66	8.86	16.5
MAX	16	19	15	23	30	450	103	76	50	12	19	37
MIN	12	10	8.5	9.0	8.0	12	23	23	12	7.7	6.8	10
AC-FT	871	861	684	790	770	6230	2420	2220	1150	594	545	984
CFSM	.08	.08	.06	.07	.08	.57	.23	.20	.11	.05	.05	.09
IN.	.09	.09	.07	.08	.08	.66	.26	.24	.12	.06	.06	.10

CAL YR 1988 TOTAL 15465.2 MEAN 42.3 MAX 430 MIN 8.5 AC-FT 30680 CFSM .24 IN. 3.25
WTR YR 1989 TOTAL 9132.7 MEAN 25.0 MAX 450 MIN 6.8 AC-FT 18110 CFSM .14 IN. 1.92

05412060 SILVER CREEK NEAR LUANA, IA

LOCATION.--Lat 43°01'19", long 91°29'21", in NE1/4 SEC.25, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank of bridge on county road W70, 2.3 miles south of Highway 52 and 18, and 3.2 miles south of Luana.

DRAINAGE AREA.--4.39 mi^2.

PERIOD OF RECORD.--May 1986 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Estimated daily discharges: Oct. 7, 8, 12, Nov. 28, 30, Dec. 10, 13-15, Jan. 17, 19, Feb. 6-8, 10-15, 17-22, 25,26, Feb. 28 to Mar. 4, Mar. 10,11, 14, Mar. 28 to Apr. 4, July 28, Aug. 8, 11, 16-18, 20, and Sept. 2-13. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 181 ft^3/s Mar. 11, 1989, gage height, 8.78 ft (backwater from ice); no flow, Aug. 21, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 22	1700	60	6.46	Mar. 11	1540	*181	(a)*8.78
Jan. 30	1615	149	6.91	Mar. 14	1230	160	(a) 8.53
Mar. 10	1515	120	(a) 7.51	Aug. 22	1840	98	6.66

(a) backwater from ice.
No flow, Aug. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.41	.35	.19	.12	.54	.10	.25	.17	.19	.12	.03	1.5
2	.26	.27	.21	.10	.42	.09	.22	.17	.18	.19	.03	.90
3	.18	.19	.24	.09	.34	.09	.17	.17	.24	.27	.03	.60
4	.14	.18	.22	.07	.24	.08	.14	.19	.17	.22	.15	.40
5	.35	.16	.23	.09	.22	.08	.14	.19	.13	.18	.55	.30
6	.28	.14	.25	.11	.21	.09	.11	.17	.14	.17	.14	.24
7	.22	.15	.20	.13	.20	.09	.14	.17	.13	.20	.03	.20
8	.22	.14	.17	.11	.19	.08	.16	.16	.13	.18	.02	.28
9	.22	.15	.15	.06	.17	.14	.09	.20	.13	.22	.03	.26
10	.12	.14	.12	.02	.18	21	.07	.23	.12	.17	.03	.24
11	.14	.12	.09	.03	.19	83	.06	.22	.12	.18	.02	.22
12	.14	.20	.07	.03	.20	9.2	.06	.23	.18	.21	.06	.20
13	.15	.22	.11	.03	.21	2.7	.05	.22	.14	.23	.09	.18
14	.21	.17	.14	.04	.21	37	.06	.21	.10	.21	.03	.15
15	.21	.29	.10	.05	.19	.97	.05	.22	.09	.24	.01	.11
16	.16	.39	.08	.07	.18	.47	.06	.20	.09	.26	.01	.10
17	.15	.26	.09	.07	.18	.46	.06	.18	.09	.15	.01	.10
18	.15	.22	.13	.07	.17	.38	.05	.23	.09	.20	.01	.10
19	.12	.24	.21	1.0	.16	.33	.04	.24	.11	.14	.01	.10
20	.14	.18	.31	.50	.15	.32	.07	.20	.13	.09	.01	.10
21	.21	.20	.21	.21	.14	.32	.08	.17	.08	.06	.00	.08
22	.14	.20	.22	7.9	.13	.59	.09	.17	.35	.07	4.9	.10
23	.14	.22	.25	2.4	.12	.81	.25	.16	.27	.07	1.3	.10
24	.11	.22	.20	.66	.13	.42	.17	.21	.20	.06	.12	.08
25	.09	.23	.16	.32	.15	.32	.16	.24	.23	.06	.04	.09
26	.26	.30	.16	.27	.17	.28	.17	.16	.29	.05	.08	.09
27	.30	.25	.22	4.8	.13	.27	.17	.13	.29	.04	.06	.08
28	.25	.23	.14	1.0	.11	.28	.20	.14	.13	.02	1.0	.09
29	.21	.20	.07	6.9	---	.35	.18	.24	.14	.03	.20	.07
30	.25	.21	.07	23	---	.32	.17	.33	.12	.06	.07	.06
31	.31	---	.13	8.3	---	.27	---	.30	---	.04	.20	---
TOTAL	6.24	6.42	5.14	58.55	5.63	160.90	3.69	6.22	4.80	4.39	9.27	7.12
MEAN	.20	.21	.17	1.89	.20	5.19	.12	.20	.16	.14	.30	.24
MAX	.41	.39	.31	23	.54	83	.25	.33	.35	.27	4.9	1.5
MIN	.09	.12	.07	.02	.11	.08	.04	.13	.08	.02	.00	.06
AC-FT	12	13	10	116	11	319	7.3	12	9.5	8.7	18	14
CFSM	.05	.05	.04	.43	.05	1.18	.03	.05	.04	.03	.07	.05
IN.	.05	.05	.04	.50	.05	1.36	.03	.05	.04	.04	.08	.06

CAL YR 1988 TOTAL 488.24 MEAN 1.33 MAX 26 MIN .05 AC-FT 968 CFSM .30 IN. 4.14
WTR YR 1989 TOTAL 278.37 MEAN .76 MAX 83 MIN .00 AC-FT 552 CFSM .17 IN. 2.36

05412070 UNNAMED CREEK NEAR LUANA, IA

LOCATION.--Lat 43°02'24", long 91°28'07", in SE 1/4 sec.18, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank at culvert on the north-south gravel road between county road W70 and county road X16, 0.8 mile south of State Highway 52 and 18 and approximately 1.6 miles south of Luana.

DRAINAGE AREA.--1.15 mi^2.

PERIOD OF RECORD.--May 1986 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Estimated daily discharges: Jan. 6 to Mar. 7. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 96 ft^3/s Aug. 13, 1987, gage height, 11.81 ft; maximum gage height, 11.84 ft, Mar. 1, 1988, (backwater from ice); no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25 ft^3/s and maximum (*);

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	1500	37	(a) *11.46	Mar. 14	1115	*43	(a) 11.45

(a) Backwater from ice

No flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.5
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.13	.01
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.14	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.16
9	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.70
10	.00	.00	.00	.00	.00	7.0	.00	.00	.00	.00	.00	.02
11	.00	.00	.00	.00	.00	6.9	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	2.5	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.24	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	5.1	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.18	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.08	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.08	.00	.00
20	.00	.00	.00	.00	.00	.27	.00	.00	.00	.01	.00	.00
21	.00	.00	.00	.00	.00	.23	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.82	.00	.00	.00	.00	.34	.00
23	.00	.00	.00	.00	.00	.70	.00	.00	.00	.00	.07	.00
24	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.4	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.09	---
TOTAL	0.00	0.00	0.00	0.00	0.00	24.14	0.00	0.00	0.00	0.15	2.18	2.39
MEAN	.00	.00	.00	.00	.00	.78	.00	.00	.00	.005	.070	.080
MAX	.00	.00	.00	.00	.00	7.0	.00	.00	.00	.08	1.4	1.5
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	48	.0	.0	.0	.3	4.3	4.7
CFSM	.00	.00	.00	.00	.00	.68	.00	.00	.00	.00	.06	.07
IN.	.00	.00	.00	.00	.00	.78	.00	.00	.00	.00	.07	.08

CAL YR 1988 TOTAL 82.87 MEAN .23 MAX 7.0 MIN .00 AC-FT 164 CFSM .20 IN. 2.68
WTR YR 1989 TOTAL 28.86 MEAN .079 MAX 7.0 MIN .00 AC-FT 57 CFSM .07 IN. .93

05412100 ROBERTS CREEK ABOVE SAINT OLAF, IA

LOCATION.--Lat 42°55'49", long 91°23'03", in NW1/4 sec.25, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on left downstream bank at bridge on road X28, 0.1 mi north of county road B65, on north edge of St. Olaf.

DRAINAGE AREA.--70.7 mi^2.

PERIOD OF RECORD.--September 1957 to July 1977 (operated as a low-flow station only), March 1986 to current year.

GAGE.--Water-stage recorder. Datum of gage is 826.73 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 29 to Mar. 17, June 25, June 29 to July 16, Aug. 22, Aug. 24 to Sept. 6 and Sept. 23. Records poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,020 ft^3/s Mar. 11, 1989, gage height, 15.77 ft, backwater from ice; no flow July 25 to Aug. 1 and Aug. 8-22, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	1900	*1,020	(a) *15.77	Mar. 14	----	1,000	ice jam

(a) Ice jam

No flow July 25 to Aug. 1 and Aug. 8-22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.54	1.4	1.5	.74	9.0	.86	4.0	2.0	1.9	.06	.00	10
2	.47	.84	1.8	.64	2.5	.80	3.6	1.6	1.1	.05	.03	2.0
3	.46	1.0	1.6	.56	1.0	.80	3.0	1.7	1.2	.05	.03	.90
4	.36	1.2	1.5	.52	.85	.84	2.2	1.9	.72	.04	.22	.50
5	.30	1.4	1.7	.50	.78	.78	1.7	2.1	.37	.03	6.9	.25
6	.25	1.5	1.8	.58	.72	.88	1.1	2.1	.17	.03	1.1	.16
7	.32	2.3	1.6	.62	.70	.84	.81	1.6	.08	.03	.05	.23
8	.74	1.2	1.4	.56	.68	.80	.75	1.4	.06	.03	.00	.21
9	.44	.89	1.1	.50	.70	.90	.75	1.7	.06	.02	.00	.26
10	.41	1.0	.90	.48	.74	50	.58	1.8	.07	.02	.00	.21
11	.27	1.1	.78	.52	.82	290	.42	1.4	.09	.10	.00	.12
12	.24	1.5	.70	.52	.90	110	.43	.76	.23	.08	.00	.15
13	.22	2.0	.74	.49	.94	60	.60	.40	.24	.06	.00	.04
14	.23	2.8	.84	.52	.86	250	.48	.19	.16	.04	.00	.02
15	.29	4.3	.75	.56	.80	90	.28	.15	.13	.04	.00	.10
16	.34	18	.64	.52	.77	20	.27	.14	.13	.03	.00	.10
17	.34	10	.68	.54	.76	10	.27	.09	.12	.08	.0	.10
18	.49	4.6	.74	.58	.72	8.1	.23	.13	.15	.66	.00	.09
19	.52	3.4	1.0	1.0	.70	11	.17	.25	.15	.74	.00	.09
20	.60	3.2	1.4	10	.70	12	.23	.21	.10	.42	.00	.11
21	.70	3.0	1.1	6.3	.72	10	.37	.12	.15	.21	.00	.07
22	.67	2.7	1.2	3.7	.68	10	.79	.12	.25	.12	.00	.05
23	1.3	3.0	1.3	12	.64	49	3.7	.08	.27	.08	19	.05
24	1.1	3.2	1.3	7.0	.70	52	6.2	.17	.15	.01	8.0	.04
25	.82	3.1	1.0	4.0	.91	25	3.1	.33	.10	.0	1.2	.04
26	.90	3.1	.94	1.2	1.2	18	2.3	.21	.13	.00	1.4	.03
27	.57	3.3	1.1	1.0	1.0	16	2.1	.12	.08	.0	.80	.02
28	.33	3.6	.95	4.0	.94	13	2.6	.07	.09	.00	1.0	.04
29	.24	2.0	.84	10	---	11	3.1	.23	.07	.00	.70	.02
30	.46	2.3	.88	45	---	7.3	2.7	.81	.06	.00	.40	.04
31	1.0	---	.82	20	---	5.2	---	2.9	---	.00	1.6	---
TOTAL	15.92	92.93	34.60	135.15	32.43	1135.10	48.83	26.78	8.58	3.03	42.43	16.04
MEAN	.51	3.10	1.12	4.36	1.16	36.6	1.63	.86	.29	.098	1.37	.53
MAX	1.3	18	1.8	45	9.0	290	6.2	2.9	1.9	.74	19	10
MIN	.22	.84	.64	.48	.64	.78	.17	.07	.06	.00	.00	.02
AC-FT	32	184	69	268	64	2250	97	53	17	6.0	84	32
CFSM	.01	.04	.02	.06	.02	.52	.02	.01	.00	.00	.02	.01
IN.	.01	.05	.02	.07	.02	.60	.03	.01	.00	.00	.02	.01

CAL YR 1988 TOTAL 4327.43 MEAN 11.8 MAX 190 MIN .03 AC-FT 8580 CFSM .17 IN. 2.28
WTR YR 1989 TOTAL 1591.82 MEAN 4.36 MAX 290 MIN .00 AC-FT 3160 CFSM .06 IN. .84

05412500 TURKEY RIVER AT GARBER, IA

LOCATION.--Lat 42°44'24", long 91°15'42", in SE1/4 NW1/4 sec.36, T.92 N., R.4 W., Clayton County, Hydrologic Unit 07060004, on left bank 10 ft downstream from bridge on county highway C43, 800 ft upstream from Wayman Creek, 1,000 ft southeast of Garber, 2,000 ft downstream from Elk Creek, 1 mi downstream from Volga River, and 19.8 mi upstream from mouth.

DRAINAGE AREA.--1,545 mi^2.

PERIOD OF RECORD.--August 1913 to November 1916, May 1919 to September 1927, April 1929 to September 1930, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1922-25 (M), 1927 (M). WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 634.46 ft above NGVD. Prior to Feb. 7, 1935, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 3 to Mar. 14. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--69 years (water years 1914-16, 1920-27, 1930, 1933-89), 943 ft^3/s, 8.29 in/yr, 683,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,300 ft^3/s Feb. 23, 1922, gage height, 28.06 ft, from floodmark; minimum daily discharge, 49 ft^3/s Jan. 28, 29, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1890, that of Feb. 23, 1922.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	0315	*9,900	(a) *17.82	No other peak greater than base discharge.			

(a) Ice jam

Minimum discharge, 105 ft^3/s Aug. 18, 19, 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	183	162	186	180	340	200	471	515	619	168	114	928
2	174	159	167	175	200	190	436	508	480	165	109	957
3	168	159	180	170	140	180	409	455	392	169	107	627
4	169	159	190	160	120	200	388	423	350	160	113	475
5	166	170	200	150	150	230	360	424	320	161	340	400
6	164	172	190	160	200	200	339	399	298	153	372	359
7	160	172	180	180	240	190	323	377	279	142	225	324
8	156	169	170	190	220	210	317	361	267	139	187	312
9	156	167	160	180	200	220	305	363	256	136	164	334
10	154	163	160	170	220	250	293	339	243	126	148	363
11	152	161	150	160	230	2000	282	316	236	124	138	359
12	149	164	160	170	250	5000	274	300	255	121	130	329
13	151	170	170	160	230	3000	264	286	277	117	124	299
14	151	172	180	170	220	2800	260	277	266	114	122	261
15	151	175	170	180	190	5050	252	264	255	114	121	240
16	151	282	160	170	180	2570	248	254	229	125	116	225
17	156	268	150	180	170	1630	246	244	218	114	111	218
18	165	234	160	190	180	954	237	238	210	139	107	208
19	161	222	170	180	170	722	231	250	203	161	106	199
20	161	215	190	190	165	694	229	311	191	168	118	191
21	166	209	180	180	160	666	237	247	182	139	112	182
22	169	203	190	190	170	622	238	232	181	131	115	177
23	176	197	200	200	160	950	333	220	192	126	823	173
24	169	194	210	190	180	1360	542	218	179	120	532	169
25	164	194	200	200	200	1210	674	220	172	118	321	168
26	161	205	190	190	230	986	569	214	195	114	267	163
27	159	208	180	180	220	840	514	207	217	113	236	156
28	155	206	175	200	210	759	591	217	209	112	223	153
29	160	203	170	220	---	684	582	214	193	113	214	151
30	169	199	165	260	---	596	538	272	180	113	218	148
31	164	---	170	290	---	527	---	421	---	114	211	---
TOTAL	5010	5733	5473	5765	5545	35690	10982	9586	7744	4129	6344	9248
MEAN	162	191	177	186	198	1151	366	309	258	133	205	308
MAX	183	282	210	290	340	5050	674	515	619	169	823	957
MIN	149	159	150	150	120	180	229	207	172	112	106	148
AC-FT	9940	11370	10860	11430	11000	70790	21780	19010	15360	8190	12580	18340
CFSM	.10	.12	.11	.12	.13	.75	.24	.20	.17	.09	.13	.20
IN.	.12	.14	.13	.14	.13	.86	.26	.23	.19	.10	.15	.22

CAL YR 1988 TOTAL 189011 MEAN 516 MAX 2700 MIN 120 AC-FT 374900 CFSM .33 IN. 4.55
WTR YR 1989 TOTAL 111249 MEAN 305 MAX 5050 MIN 106 AC-FT 220700 CFSM .20 IN. 2.68

05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IA

LOCATION.--Lat 42°08'48", long 90°40'33" in SW1/4 NE1/4 sec.25, T.85 N., R.2 E, Jackson County, Hydrologic Unit 07060006, on right downstream bank at bridge on State Highway 61, 7.8 mi upstream from mouth, and 5.5 mi north of junction of State Highway 64 and 61 and 0.5 mi south of Fulton.

DRAINAGE AREA.--516 mi^2.

PERIOD OF RECORD.--July 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 666.19 ft above NGVD. Nonrecording gage July 7 to September 22, 1977.

REMARKS.--Estimated daily discharges: Dec. 8, 10-18, Jan. 9-16, 20, 21, 23-26, Jan. 28 to Feb. 2, 5-9, Feb. 25 to Mar. 11, and Aug. 26 to Sept. 8. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--12 years, 350 ft^3/s, 9.21 in/yr, 253,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft^3/s Aug. 31, 1981, gage height, 17.26 ft; minimum discharge, 52 ft^3/s Feb. 3, 1989 (result of freezeup).

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 18, 1974 reached a stage of 16.0 ft., from floodmark, discharge 10,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	0030	*5,500	(a) *13.00	No other peak greater than base discharge.			

(a) Ice jam

Minimum discharge, 52 ft^3/s Feb. 3, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	117	132	137	125	260	150	146	134	194	99	99	220
2	118	129	136	118	140	140	147	134	190	99	98	200
3	118	131	130	119	107	135	149	134	173	97	101	170
4	123	137	137	121	88	150	147	134	171	97	135	150
5	115	139	135	124	110	170	141	136	166	97	241	135
6	102	133	135	133	150	150	138	132	165	100	173	125
7	113	131	131	149	180	145	136	129	167	107	142	130
8	114	132	125	141	165	160	138	134	165	107	120	144
9	116	133	116	135	150	170	134	137	171	109	108	319
10	119	141	110	125	133	190	127	135	163	113	103	230
11	117	133	100	120	127	3000	127	137	159	113	103	165
12	115	136	110	125	127	2110	130	138	179	109	101	141
13	117	145	120	120	128	684	127	144	183	107	100	129
14	120	142	110	125	130	411	129	145	164	104	100	124
15	122	141	105	130	129	422	128	145	147	102	97	119
16	127	141	110	140	122	417	114	142	129	102	94	116
17	130	138	120	146	114	254	115	137	116	103	89	114
18	133	134	130	156	121	211	120	135	102	117	88	110
19	128	134	134	162	126	191	116	137	109	142	105	110
20	125	129	139	180	129	194	113	145	135	142	131	107
21	133	127	139	190	130	183	116	136	145	131	125	106
22	132	127	127	198	124	167	116	125	149	118	121	105
23	149	129	128	225	110	170	174	125	149	114	120	102
24	150	130	130	230	125	184	217	134	137	136	149	99
25	137	131	102	240	130	195	187	141	126	109	124	101
26	130	144	101	235	150	186	160	140	116	106	120	103
27	129	148	166	212	140	183	148	137	112	108	110	103
28	131	140	167	250	135	179	154	143	111	107	100	103
29	129	135	123	300	---	175	150	150	104	105	95	104
30	128	134	120	350	---	164	140	164	99	110	98	105
31	130	---	128	400	---	154	---	172	---	104	120	---
TOTAL	3867	4056	3901	5524	3780	11394	4184	4311	4396	3414	3610	4089
MEAN	125	135	126	178	135	368	139	139	147	110	116	136
MAX	150	148	167	400	260	3000	217	172	194	142	241	319
MIN	102	127	100	118	88	135	113	125	99	97	88	99
AC-FT	7670	8050	7740	10960	7500	22600	8300	8550	8720	6770	7160	8110
CFSM	.24	.26	.24	.35	.26	.71	.27	.27	.28	.21	.23	.26
IN.	.28	.29	.28	.40	.27	.82	.30	.31	.32	.25	.26	.29

CAL YR 1988 TOTAL 77293 MEAN 211 MAX 900 MIN 100 AC-FT 153300 CFSM .41 IN. 5.57
WTR YR 1989 TOTAL 56526 MEAN 155 MAX 3000 MIN 88 AC-FT 112100 CFSM .30 IN. 4.08

05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IA

LOCATION.--Lat 42°05'05", long 90°38'04", in SW1/4 NE1/4 sec.17, T.84 N., R.3 E., Jackson County, Hydrologic Unit 07060006, on right bank 300 ft upstream from bridge on State Highway 62, 1,200 ft upstream from Prairie Creek, 2.0 mi northeast of Maquoketa, 2.2 mi downstream from North Fork, and 26.7 mi upstream from mouth.

DRAINAGE AREA.--1,553 mi^2.

PERIOD OF RECORD.--September 1913 to current year. Prior to October 1939, published as "below North Fork near Maquoketa". Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 405: 1914. WSP 1438: Drainage area. WSP 1508: 1914-17, 1919-25, 1926 (M), 1929, 1933-34 (M), 1943.

GAGE.--Water-stage recorder. Datum of gage is 625.96 ft above NGVD. Prior to July 14, 1924, nonrecording gage, and July 15, 1924 to Sept. 30, 1972, recording gage at same site at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 12-23, Dec. 27 to Mar. 11, and Mar. 21 to Apr. 4. Records good except those for estimated daily discharges, which are poor. Diurnal fluctuation caused by powerplant 4 mi upstream of station. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--76 years, 1,023 ft^3/s, 8.94 in/yr, 741,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 48,000 ft^3/s June 27, 1944, gage height, 24.70 ft, at datum then in use; minimum daily discharge, 105 ft^3/s Feb. 11-20, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--A flood, probably in 1903, reached a stage of 23.5 ft, discharge, 43,000 ft^3/s, at datum in use prior to Oct. 1, 1972.

EXTREMES FOR CURRENT YEAR.-- Peak discharges greater than base discharge of 7,500 ft^3/s and maximum (*)

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	0719	*5,000	(a) *20.42				

(a) Ice jam

Minimum daily discharge, 199 ft^3/s July 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	343	329	368	440	1300	360	577	533	503	227	226	650
2	345	340	302	430	600	330	557	492	362	239	220	641
3	306	325	382	410	350	360	535	484	340	228	226	434
4	316	378	386	400	400	700	481	493	324	240	325	427
5	304	381	334	420	500	600	462	479	307	206	638	348
6	293	373	394	410	540	540	457	473	288	232	403	321
7	288	355	350	390	600	500	398	464	281	199	306	297
8	289	332	339	370	560	470	426	423	280	203	297	316
9	294	344	322	360	520	450	437	478	300	215	315	497
10	326	399	303	350	500	1000	413	423	295	214	269	744
11	286	368	280	370	480	3000	373	390	267	215	243	568
12	324	364	400	360	500	4490	408	363	311	223	245	526
13	297	405	360	350	520	3410	388	358	343	206	224	532
14	278	380	390	330	500	2170	379	430	307	212	252	497
15	304	390	350	350	470	1690	357	340	302	212	245	473
16	350	399	310	380	450	1530	366	347	277	222	221	468
17	338	381	320	420	420	1300	408	364	273	207	230	467
18	330	388	330	440	390	1110	385	356	259	263	228	469
19	327	418	340	470	360	986	374	368	261	294	239	373
20	343	395	350	490	330	931	360	370	241	336	275	360
21	348	372	370	510	320	843	350	356	248	283	284	324
22	328	373	400	530	330	800	386	380	236	268	253	321
23	361	365	430	540	300	767	460	367	229	245	226	290
24	416	382	392	560	320	740	551	342	227	366	269	291
25	356	381	406	580	350	711	534	372	258	280	268	289
26	345	404	380	600	380	677	537	344	228	261	251	284
27	355	409	500	600	360	656	502	323	227	255	256	290
28	323	416	450	620	380	696	521	320	264	233	232	270
29	320	375	420	700	---	666	519	315	226	232	220	286
30	342	385	400	900	---	635	507	326	239	236	231	257
31	348	---	420	1100	---	602	---	362	---	218	232	---
TOTAL	10123	11306	11478	15180	13030	33720	13408	12235	8503	7470	8349	12310
MEAN	327	377	370	490	465	1088	447	395	283	241	269	410
MAX	416	418	500	1100	1300	4490	577	533	503	366	638	744
MIN	278	325	280	330	300	330	350	315	226	199	220	257
AC-FT	20080	22430	22770	30110	25850	66880	26590	24270	16870	14820	16560	24420
CFSM	.21	.24	.24	.32	.30	.70	.29	.25	.18	.16	.17	.26
IN.	.24	.27	.27	.36	.31	.81	.32	.29	.20	.18	.20	.29

CAL YR 1988 TOTAL 226304 MEAN 618 MAX 3900 MIN 278 AC-FT 448900 CFSM .40 IN. 5.42
WTR YR 1989 TOTAL 157112 MEAN 430 MAX 4490 MIN 199 AC-FT 311600 CFSM .28 IN. 3.76

05420500 MISSISSIPPI RIVER AT CLINTON, IA

LOCATION.--Lat 41°46'53", long 90°15'04", in NW1/4 sec.34, T.81 N., R.6 E., Clinton County, Hydrologic Unit 07080101, on right bank at foot of Seventh Avenue in Camanche, 5.0 mi upstream from Wapsipinicon River, 6.4 mi downstream from Clinton, 10.6 mi downstream from Lock and Dam 13, and at mile 511.8 upstream from Ohio River. Prior to June 6, 1969, at site 400 ft downstream.

DRAINAGE AREA.--85,600 mi^2, approximately, at Fulton-Lyons Bridge at Clinton.

PERIOD OF RECORD.--June to August 1873 (fragmentary), October 1873 to current year (October 1932 to September 1939, published as "at Le Claire").

REVISED RECORDS.--WDR IA-75-1: 1974.

GAGE.--Water-stage recorder. Datum of gage is 562.68 ft above NGVD. Oct. 1, 1955, to June 5, 1969, water-stage recorder at site 400 ft downstream at same datum. Auxiliary water-stage recorder at Lock and Dam 13 since Oct. 1, 1956. See WSP 1728 for history of changes prior to Oct. 1, 1955.

REMARKS.--Estimated daily discharges: Dec. 11 to Jan. 27 and Feb. 2 to Mar. 10. Records good except those for estimated daily discharges or discharges below 10,000 ft^3/s, which are poor. Minor flow regulation caused by navigation dams. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform and gage-height telemeter at station.

AVERAGE DISCHARGE.--116 years, 47,600 ft^3/s, 7.55 in/yr, 34,490,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 307,000 ft^3/s Apr. 28, 1965; maximum gage height, 24.65 ft Apr. 28, 1965; minimum daily discharge, 6,500 ft^3/s Dec. 25-27, 1933.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since at least 1828, that of Apr. 28, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 104,000 ft^3/s Apr. 6; maximum gage height, 14.19 ft Apr. 6, minimum daily discharge, 11,400 ft^3/s Aug. 15; minimum gage height, 8.57 ft Aug. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23400	18800	28500	25200	33000	22800	79400	52700	50800	31200	11900	22400
2	25300	17600	27000	24500	32600	22400	86000	52600	54900	32200	12600	26600
3	28500	17600	25600	23700	25200	22400	88500	51900	57700	32100	14600	27600
4	29000	18700	25200	23000	19100	23300	94100	50700	60200	31000	19500	25400
5	28100	21000	25800	22600	19300	24700	101000	49600	62100	29600	25400	24000
6	26200	23000	26200	22600	20100	24300	104000	51300	64500	28200	26900	23500
7	23400	24200	25500	21800	20800	23600	103000	52600	67600	27100	26600	28000
8	22300	25000	27200	20500	21300	22700	98200	52700	70600	27000	23300	32700
9	22100	24100	28400	20200	21500	21500	89200	51700	69200	26500	16700	37200
10	23200	23500	23800	20400	22200	22000	80900	50700	64400	24600	16700	39800
11	21100	22100	18400	20400	23300	29000	75200	50800	52700	23500	15500	37500
12	18100	21100	15200	20400	24100	37100	73200	50500	45600	23700	14400	32900
13	17300	22500	14700	20300	24400	41000	72700	49800	41500	24000	13300	31900
14	16900	20900	14300	20000	24400	44100	71600	49100	37000	22300	11800	29400
15	16000	22000	14500	20000	24200	48500	72100	48500	28300	20500	11400	25900
16	15700	27700	14000	20100	24200	49300	71900	46700	25000	19300	11700	21700
17	17400	23900	13900	20200	24200	50700	70000	45200	25600	20000	13700	18700
18	19900	27100	15400	20800	24200	50900	68700	45400	26900	19700	15500	18000
19	22000	28500	16200	21200	24200	50000	67500	44900	31400	18200	17200	15700
20	23200	31400	18500	21400	24200	51500	63700	43700	34300	16800	18200	14100
21	22800	33900	19400	21700	24200	51100	60300	43500	34600	18500	17500	14400
22	22700	35200	20500	21700	24400	45100	59300	41200	37100	21600	19800	19000
23	23500	35800	22600	21700	24400	40200	56800	38000	36300	20500	19300	22600
24	22900	35400	24900	21500	24300	37500	55200	35100	34900	17600	18700	21400
25	22100	35000	24600	21600	24200	37300	55900	33000	30700	18200	18700	16800
26	21000	33300	23900	22200	24000	40200	59300	33000	24000	16200	18700	14100
27	21300	34600	25700	22900	23800	49400	54700	36200	26500	16800	18100	15200
28	19700	31500	26200	23700	23300	53000	54700	37500	28100	13500	20900	16400
29	19500	31100	25900	25800	---	66100	55700	40600	27700	13100	21800	16000
30	21400	29700	25700	30200	---	69900	55500	43200	29500	11900	22700	16600
31	23000	---	25600	34400	---	75300	---	45300	---	12000	22200	---
TOTAL	679000	796200	683300	696700	669100	1252900	2198300	1417700	1279700	677400	555300	705500
MEAN	21900	26540	22040	22470	23900	40420	73280	45730	42660	21850	17910	23520
MAX	29000	35800	28500	34400	33000	75300	104000	52700	70600	32200	26900	39800
MIN	15700	17600	13900	20000	19100	21500	54700	33000	24000	11900	11400	14100
AC-FT	1347000	1579000	1355000	1382000	1327000	2485000	4360000	2812000	2538000	1344000	1101000	1399000
CFSM	.26	.31	.26	.26	.28	.47	.86	.53	.50	.26	.21	.27
IN.	.30	.35	.30	.30	.29	.54	.96	.62	.56	.29	.24	.31

CAL YR 1988 TOTAL 9727100 MEAN 26580 MAX 65800 MIN 10700 AC-FT 19290000 CFSM .31 IN. 4.23
WTR YR 1989 TOTAL 11611100 MEAN 31810 MAX 104000 MIN 11400 AC-FT 23030000 CFSM .37 IN. 5.05

05420560 WAPSIPINICON RIVER NEAR ELMA, IA

LOCATION.--Lat 43°14'34", long 92°31'48", in NW1/4 NW1/4 sec.8, T.97 N., R.14 W., Howard County, Hydrologic Unit 07080102, on right bank 10 ft downstream from bridge on county highway B17, 0.2 mi downstream from small left-bank tributary, 4.8 mi west of Elma, and at mile 217.9.

DRAINAGE AREA.--95.2 mi^2.

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,130.05 ft above NGVD.

REMARKS.--Estimated daily discharges: Jan. 27 to Feb. 7, and Feb. 13 to Mar. 24. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--31 years, 65.2 ft^3/s, 9.30 in/yr, 47,240 acre-ft/yr; median of yearly mean discharges, 56 ft^3/s, 8.0 in/yr, 40,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,100 ft^3/s June 4, 1974, gage height, 14.94 ft, from high-water mark in well; maximum gage height, 15.38 ft, from high-water mark in well, probably occurred Aug. 22, 1979 (backwater from vegetation); minimum daily discharge, 1.9 ft^3/s Feb. 4-8, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	0230	*390	(a)*11.04				

(a) ice jam

Minimum daily discharge, 2.8 ft^3/s Sept. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.7	6.6	7.3	5.0	7.0	4.6	9.4	39	10	7.9	6.0	14
2	5.8	6.7	6.7	5.1	5.6	4.5	7.7	33	8.3	8.0	5.6	18
3	5.4	6.2	6.7	4.9	4.8	4.4	8.0	29	7.5	8.0	5.7	20
4	6.0	6.4	6.6	4.9	4.3	4.6	9.1	27	6.8	7.6	5.6	14
5	6.2	6.9	6.7	4.7	4.6	4.5	8.9	28	6.4	7.6	5.6	11
6	6.2	6.7	6.8	4.7	4.6	4.6	7.5	27	6.2	7.8	5.0	8.1
7	6.2	6.4	6.8	4.7	4.8	4.9	6.6	24	5.8	7.9	5.0	6.5
8	6.3	6.2	6.2	4.8	4.9	5.6	6.4	22	5.9	7.9	6.3	6.6
9	6.3	6.2	5.7	4.8	4.7	6.0	5.5	22	5.9	8.1	8.6	6.2
10	6.7	6.5	6.0	4.8	5.0	11	5.2	21	5.7	8.3	8.1	8.9
11	7.8	6.8	5.7	4.7	5.2	150	5.3	20	5.5	9.0	8.4	11
12	7.6	7.3	5.2	4.6	5.3	300	5.2	18	5.6	10	8.6	8.0
13	6.7	7.9	5.3	4.6	5.2	210	5.5	18	5.6	10	11	6.9
14	6.3	8.0	5.8	4.8	5.1	160	5.5	17	5.4	9.8	12	5.7
15	6.4	8.4	5.7	4.8	5.0	120	6.0	13	5.7	9.1	11	4.7
16	7.4	11	5.4	4.9	4.8	68	6.9	8.9	5.7	10	9.8	4.2
17	5.9	11	5.2	5.1	4.7	52	7.3	8.2	5.6	9.8	8.8	4.1
18	5.3	8.7	5.4	5.3	4.9	45	7.8	8.2	5.6	31	8.4	3.8
19	6.1	7.6	5.9	5.5	4.8	41	7.8	11	5.6	41	9.3	3.7
20	6.0	6.5	7.1	5.8	4.7	43	8.6	17	5.9	15	8.9	3.5
21	6.5	5.9	6.9	5.9	4.9	47	9.4	14	6.2	9.3	7.9	3.5
22	6.7	6.4	8.0	6.1	5.0	52	16	11	6.7	6.9	7.3	3.6
23	6.9	7.1	9.4	6.6	4.6	64	32	9.4	6.9	6.3	8.7	4.3
24	6.6	7.3	8.4	6.7	4.8	120	39	9.0	7.4	6.5	8.5	4.2
25	6.7	7.3	7.6	6.1	5.0	138	31	36	7.3	12	7.4	4.8
26	7.0	8.0	6.6	6.2	5.2	80	29	21	8.7	14	7.0	4.5
27	7.1	7.6	6.2	6.0	4.7	63	37	14	11	8.6	7.5	5.0
28	7.7	5.5	6.0	6.6	4.9	52	47	12	10	6.3	8.9	5.4
29	7.1	7.6	5.4	6.4	---	35	64	10	9.3	6.0	15	5.4
30	6.6	7.3	4.9	6.0	---	20	48	10	8.8	6.0	13	5.2
31	6.9	---	4.8	6.6	---	14	---	10	---	6.2	9.1	---
TOTAL	203.1	218.0	196.4	167.7	139.1	1928.7	492.6	567.7	207.0	321.9	258.0	214.8
MEAN	6.55	7.27	6.34	5.41	4.97	62.2	16.4	18.3	6.90	10.4	8.32	7.16
MAX	7.8	11	9.4	6.7	7.0	300	64	39	11	41	15	20
MIN	5.3	5.5	4.8	4.6	4.3	4.4	5.2	8.2	5.4	6.0	5.0	3.5
AC-FT	403	432	390	333	276	3830	977	1130	411	638	512	426
CFSM	.07	.08	.07	.06	.05	.65	.17	.19	.07	.11	.09	.08
IN.	.08	.09	.08	.07	.05	.75	.19	.22	.08	.13	.10	.08

CAL YR 1988 TOTAL 5990.9 MEAN 16.4 MAX 200 MIN 3.6 AC-FT 11880 CFSM .17 IN. 2.34
WTR YR 1989 TOTAL 4915.0 MEAN 13.5 MAX 300 MIN 3.5 AC-FT 9750 CFSM .14 IN. 1.92

05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IA

LOCATION.--Lat 42°27'49", long 91°53'42", in SE1/4 sec.4, T.88 N., R.9 W., Buchanan County, Hydrologic Unit 07080102, on right bank at Sixth Street in Independence, 1,800 ft downstream from dam at abandoned hydroelectric plant, 4.9 mi downstream from Otter Creek, 9.7 mi upstream from Pine Creek, and at mile 142.5.

DRAINAGE AREA.--1,048 mi^2.

PERIOD OF RECORD.--July 1933 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1938-39, 1940 (M), 1947.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 882.85 ft above NGVD. Prior to May 24, 1941 nonrecording gage in tailrace of powerplant 1,800 ft upstream at datum 80.00 ft lower.

REMARKS.-- No estimated daily discharges. Records good. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--56 years, 610 ft^3/s, 7.90 in/yr, 441,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,800 ft^3/s July 18, 1968, gage height, 21.11 ft; minimum daily discharge, 7.0 ft^3/s for several days in 1934 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1901, that of July 18, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	0115	*2,390	*7.03				

Minimum discharge, 17 ft^3/s Aug. 18, 19, 21, 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	32	45	32	430	36	367	373	116	39	31	28
2	35	28	49	32	240	37	335	341	124	38	29	34
3	31	33	63	31	129	39	305	320	139	37	29	36
4	30	42	54	29	123	38	279	307	124	33	29	40
5	27	56	57	37	104	36	249	305	107	31	29	42
6	27	34	58	50	96	34	238	268	93	31	27	42
7	27	28	55	85	88	34	211	250	85	29	27	44
8	27	34	41	61	81	34	229	235	84	27	26	826
9	27	37	43	49	78	46	204	242	72	27	25	1790
10	29	45	47	45	61	223	185	223	62	27	25	947
11	24	32	39	40	58	855	183	216	61	26	24	653
12	21	46	36	37	55	941	173	197	76	25	23	453
13	21	48	36	34	57	820	156	180	68	25	23	332
14	21	46	39	34	53	701	164	166	62	25	22	263
15	23	55	37	33	50	581	144	147	56	25	21	215
16	28	89	33	32	43	661	140	132	55	24	19	182
17	33	67	32	33	46	744	141	122	53	25	19	157
18	31	60	32	34	47	713	130	124	51	28	18	137
19	29	73	33	36	45	815	122	131	48	27	20	124
20	28	70	44	45	45	858	119	131	41	26	20	105
21	37	59	41	53	44	668	120	129	39	25	19	97
22	31	56	41	51	39	547	135	133	43	25	18	101
23	44	61	42	77	39	482	470	127	41	26	20	77
24	33	58	50	115	42	492	496	129	36	25	20	73
25	30	64	42	105	40	500	421	119	35	26	21	75
26	25	69	43	90	39	523	414	114	43	27	21	69
27	31	74	46	90	37	529	416	97	46	29	21	65
28	32	51	40	101	38	541	453	91	41	29	21	65
29	29	58	36	189	---	516	452	91	37	30	21	62
30	28	62	34	367	---	489	415	96	38	31	21	61
31	32	---	32	427	---	420	---	101	---	30	21	---
TOTAL	908	1567	1320	2474	2247	13953	7866	5637	1976	878	710	7195
MEAN	29.3	52.2	42.6	79.8	80.2	450	262	182	65.9	28.3	22.9	240
MAX	44	89	63	427	430	941	496	373	139	39	31	1790
MIN	21	28	32	29	37	34	119	91	35	24	18	28
MED	29	55	41	45	51	516	220	133	55	27	21	87
AC-FT	1800	3110	2620	4910	4460	27680	15600	11180	3920	1740	1410	14270
CFSM	.03	.05	.04	.08	.08	.43	.25	.17	.06	.03	.02	.23
IN.	.03	.06	.05	.09	.08	.50	.28	.20	.07	.03	.03	.26

CAL YR 1988 TOTAL 86317 MEAN 236 MAX 1700 MIN 17 AC-FT 171200 CFSM .23 IN. 3.06
WTR YR 1989 TOTAL 46731 MEAN 128 MAX 1790 MIN 18 AC-FT 92690 CFSM .12 IN. 1.66

05422000 WAPSIPINICON RIVER NEAR DE WITT, IA

LOCATION.--Lat 41°46'01", long 90°32'05", in SW1/4 NE1/4 sec.6, T.80 N., R.4 E., Clinton County, Hydrologic Unit 07080103, on left bank 5 ft upstream from bridge on U.S. Highway 61, 0.9 mi downstream from Silver Creek, 4.0 mi south of water tower in De Witt, 6.2 mi upstream from Brophy Creek, and 18.2 mi upstream from mouth.

DRAINAGE AREA.--2,330 mi^2.

PERIOD OF RECORD.--June 1934 to current year.

REVISED RECORDS.--WSP 1308: 1937 (M). WSP 1438: Drainage area. WSP 1708: 1951.

GAGE.--Water-stage recorder. Datum of gage is 598.81 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 9 to Mar. 11 and June 4, 5, 8-21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U. S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--55 years, 1,526 ft^3/s, 8.89 in/yr, 1,106,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,900 ft^3/s May 17, 1974, gage height, 13.07 ft; minimum daily discharge, 46 ft^3/s Jan. 22, 23, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	1730	ice jam	*8.60	Mar. 11	1745	*2,410	8.03

(a) Ice jam

Minimum discharge, 118 ft^3/s July 31, Aug. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	149	181	229	200	700	240	872	881	384	200	130	337
2	152	178	232	190	520	240	837	897	447	205	126	619
3	152	177	210	185	430	245	798	862	495	193	131	341
4	148	182	226	180	400	270	753	806	700	186	386	248
5	144	185	243	170	370	300	716	776	470	183	413	210
6	144	194	244	200	350	450	674	726	434	190	369	197
7	144	201	241	240	335	560	637	685	376	194	232	216
8	145	206	228	350	325	700	624	654	267	193	184	229
9	146	211	160	320	315	900	590	639	265	197	165	421
10	146	213	150	290	305	1400	587	608	244	192	153	856
11	146	218	140	260	300	1500	576	575	252	192	145	677
12	146	222	150	230	295	1610	558	551	268	210	140	506
13	144	233	160	210	285	1720	537	522	368	243	136	931
14	146	233	170	200	280	1810	488	504	335	219	137	1270
15	146	234	160	190	275	1630	468	490	272	199	200	1110
16	147	237	150	180	270	1420	453	481	260	182	183	936
17	157	234	170	180	265	1280	462	470	250	172	142	795
18	163	233	180	190	260	1120	461	477	238	171	130	681
19	163	240	190	200	255	940	451	471	230	248	126	597
20	164	235	180	210	250	981	436	436	225	228	129	535
21	173	238	170	220	245	1070	433	402	220	214	130	487
22	175	238	180	230	240	1190	446	403	224	203	127	448
23	190	245	170	240	240	1190	534	410	217	191	126	414
24	194	227	180	280	235	1170	607	401	216	250	130	384
25	191	229	190	270	235	1100	585	400	217	228	131	360
26	188	260	200	240	235	1050	701	399	228	199	187	342
27	196	278	220	210	240	970	945	385	231	170	267	324
28	194	261	240	240	240	952	938	369	223	153	208	311
29	191	255	230	300	---	977	899	346	204	137	166	298
30	185	248	220	400	---	938	908	346	203	142	151	287
31	183	---	210	600	---	905	---	332	---	135	145	---
TOTAL	5052	6726	6023	7605	8695	30828	18974	16704	8963	6019	5525	15367
MEAN	163	224	194	245	311	994	632	539	299	194	178	512
MAX	196	278	244	600	700	1810	945	897	700	250	413	1270
MIN	144	177	140	170	235	240	433	332	203	135	126	197
AC-FT	10020	13340	11950	15080	17250	61150	37630	33130	17780	11940	10960	30480
CFSM	.07	.10	.08	.11	.13	.43	.27	.23	.13	.08	.08	.22
IN.	.08	.11	.10	.12	.14	.49	.30	.27	.14	.10	.09	.25

CAL YR 1988 TOTAL 276178 MEAN 755 MAX 5800 MIN 120 AC-FT 547800 CFSM .32 IN. 4.41
WTR YR 1989 TOTAL 136481 MEAN 374 MAX 1810 MIN 126 AC-FT 270700 CFSM .16 IN. 2.18

05422470 CROW CREEK AT BETTENDORF, IA

LOCATION.--Lat 41°33'03", long 90°27'15", in NW1/4 NW1/4 sec.24, T.78 N., R.4 E., Scott County, Hydrologic Unit 07080101, on left bank 200 ft upstream from bridge on Valley Road (old U.S. Highway 67), 3.5 mi east of U.S. Highway 6, and 0.7 mi upstream from mouth.

DRAINAGE AREA.--17.8 mi^2.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 576.23 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 22, 23, 30, Jan. 4-14, Feb. 4-20, and Feb. 22 to Mar. 6. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--12 years, 14.3 ft^3/s, 10.9 in/yr, 10,360 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,480 ft^3/s June 15, 1982, gage height, 10.24 ft; minimum discharge, 0.06 ft^3/s Aug. 18, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 12	2115	367	5.31	Sept. 1	0545	*487	*5.59

Minimum discharge, 0.13 ft^3/s Oct. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.0	.88	.74	.88	1.6	.56	1.6	2.3	14	.69	.63	60
2	.89	.94	.60	.80	1.2	.58	1.7	4.3	2.4	.66	.56	9.0
3	.32	.99	.58	.71	.90	.90	1.5	2.4	23	.57	.71	5.0
4	.19	1.4	.57	.74	.85	3.0	1.4	2.0	7.5	.52	2.0	3.6
5	.19	1.4	.61	1.4	.80	7.0	1.2	2.2	3.0	.42	3.8	3.3
6	.19	1.1	.57	3.5	.75	6.0	1.2	1.7	2.1	.37	1.5	9.7
7	.21	.87	.57	2.0	.70	5.1	1.2	1.6	1.8	.30	.77	6.1
8	.28	.80	.51	1.4	.65	3.9	1.9	1.4	1.8	.31	.60	10
9	.28	1.2	.44	1.2	.60	9.2	1.7	4.3	2.0	.27	.53	40
10	.28	2.6	.47	1.1	.64	15	1.2	1.9	1.6	.25	.46	15
11	.28	.99	.44	.95	.68	9.1	.99	1.7	1.5	3.9	.45	11
12	.28	3.2	.43	.85	.72	5.4	.95	1.5	49	22	.38	7.8
13	.30	2.8	.50	.80	.76	3.4	.83	1.7	92	2.4	.34	9.0
14	.31	.93	.54	.82	.80	2.8	.88	1.5	62	1.3	18	7.1
15	.28	.97	.56	.86	.85	2.6	.87	1.5	51	.80	21	6.2
16	.19	3.1	.58	.84	.80	1.9	.88	1.5	35	.71	3.1	5.6
17	.54	1.0	.62	.85	.70	2.3	.99	1.5	23	.59	1.9	5.0
18	.69	.76	.50	.98	.75	1.7	1.6	2.5	8.0	.86	1.5	4.1
19	.54	.78	.53	.87	.80	1.5	1.6	2.3	9.6	3.0	1.4	3.3
20	.47	.69	.79	.88	.82	1.4	1.0	1.3	8.8	6.2	2.8	3.3
21	1.6	.64	.89	.82	.83	1.1	.88	.81	5.5	4.7	1.4	3.1
22	.91	.57	1.0	.80	.70	1.1	1.2	.76	4.5	2.8	1.4	3.0
23	4.4	.57	1.1	.80	.55	1.1	19	.74	8.3	1.4	3.2	2.8
24	1.2	.57	.96	.80	.50	1.1	5.1	1.7	2.6	2.5	2.2	2.7
25	.61	.57	.69	1.2	.55	1.2	3.2	1.5	2.3	1.3	1.6	2.6
26	.54	3.9	.60	1.8	.60	1.2	3.0	1.1	2.1	1.1	5.2	2.6
27	.58	4.6	7.6	1.6	.63	1.5	4.8	.69	2.4	.91	3.2	2.5
28	.82	1.3	3.2	1.5	.60	6.5	3.2	.57	1.3	.70	2.5	2.5
29	.83	.92	1.8	5.3	---	4.4	2.5	.64	.87	.61	2.0	2.4
30	.72	.87	1.3	3.0	---	2.5	1.9	.79	.71	1.8	1.7	2.4
31	.85	---	.95	1.9	---	1.9	---	1.6	---	.80	3.0	---
TOTAL	20.77	41.91	31.24	41.95	21.33	106.94	69.97	52.00	429.68	64.74	89.83	250.7
MEAN	.67	1.40	1.01	1.35	.76	3.45	2.33	1.68	14.3	2.09	2.90	8.36
MAX	4.4	4.6	7.6	5.3	1.6	15	19	4.3	92	22	21	60
MIN	.19	.57	.43	.71	.50	.56	.83	.57	.71	.25	.34	2.4
AC-FT	41	83	62	83	42	212	139	103	852	128	178	497
CFSM	.04	.08	.06	.08	.04	.19	.13	.09	.80	.12	.16	.47
IN.	.04	.09	.07	.09	.04	.22	.15	.11	.90	.14	.19	.52

CAL YR 1988 TOTAL 2338.80 MEAN 6.39 MAX 164 MIN .13 AC-FT 4640 CFSM .36 IN. 4.89
WTR YR 1989 TOTAL 1221.06 MEAN 3.35 MAX 92 MIN .19 AC-FT 2420 CFSM .19 IN. 2.55

05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IA

LOCATION.--Lat 43°00'31", long 93°37'42", in NE1/4 NW1/4 sec.36, T.95 N., R.24 W., Hancock County, Hydrologic Unit 07080207, on left bank 15 ft upstream from bridge on county highway B55, 1.2 mi west of Chicago, Rock Island and Pacific Railroad crossing in Klemme, 1.5 mi upstream from Drainage ditch 9, 18.2 mi upstream from confluence with West Branch Iowa River, and at mile 341.0.

DRAINAGE AREA.--133 mi^2.

PERIOD OF RECORD.--April 1948 to September 1976, June 1977 to current year. Prior to October 1958, published as East Fork Iowa River near Klemme.

REVISED RECORDS.--WSP 1438: Drainage area. WDR IA-80-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 1,179.33 ft above NGVD. Apr. 1, 1948, to Sept. 30, 1955, nonrecording gage at site 0.6 mi upstream at datum 0.80 ft higher. Oct. 1, 1955, to Sept. 30, 1969, at present site at datum 0.31 ft lower.

REMARKS.--Estimated daily discharges: Nov. 16-18 and Nov. 25 to Mar. 26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--40 years (water years 1948-76, 1978-89), 64.6 ft^3/s, 6.60 in/yr, 46,800 acre-ft/yr; median of yearly mean discharges, 53 ft^3/s, 5.4 in/yr, 38,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,960 ft^3/s June 19, 1954, gage height, 11.2 ft, from floodmark, site and datum then in use; maximum gage height, 10.67 ft Apr. 6, 1965 (corrected), backwater from ice; minimum daily discharge, 0.2 ft^3/s Feb. 22-26, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1944 reached a stage of about 10 ft, from information by local residents, former site and datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	1115	*150	(a) *6.40				

(a) Ice jam.

Minimum daily discharge, 1.3 ft^3/s Jan. 19, 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.4	4.2	5.2	4.1	2.8	3.0	12	16	3.9	2.2	2.7	6.2
2	3.9	4.0	5.1	3.7	3.0	2.8	11	14	3.8	2.0	2.4	5.6
3	3.7	4.0	5.0	3.4	2.7	2.9	12	12	4.5	2.0	2.5	6.4
4	3.5	4.3	4.8	3.1	2.2	3.4	11	12	4.0	2.0	4.2	11
5	3.4	4.4	4.3	3.2	2.1	5.0	9.7	12	3.6	2.0	5.6	8.4
6	3.6	4.8	4.4	3.2	1.9	10	9.2	10	3.9	2.0	5.1	4.1
7	3.5	4.6	4.1	3.0	1.8	16	9.2	9.5	4.0	2.0	4.8	3.7
8	3.5	4.0	3.8	2.8	1.9	25	11	9.2	4.3	1.8	4.7	3.9
9	3.5	4.0	3.9	2.5	2.0	37	9.5	9.0	3.5	1.6	4.9	3.5
10	3.4	3.4	3.9	2.4	2.1	63	9.6	7.8	3.3	1.6	5.0	3.4
11	3.1	3.5	4.3	2.4	2.3	130	12	7.6	3.1	3.1	5.0	3.4
12	3.2	4.8	4.5	2.2	2.6	73	11	7.1	3.5	4.8	4.9	3.4
13	3.5	5.0	4.2	1.9	2.7	52	11	6.5	3.9	2.4	4.9	3.4
14	3.6	4.1	4.0	1.7	2.8	59	12	6.0	2.7	2.0	6.7	3.4
15	3.6	5.2	4.2	1.7	2.7	89	11	5.7	2.9	1.9	5.5	3.4
16	3.5	4.9	4.9	1.6	2.6	82	11	5.5	2.4	1.8	5.3	3.2
17	3.9	5.0	5.3	1.5	2.7	68	9.6	5.9	2.7	1.8	5.3	3.2
18	4.1	5.2	5.2	1.4	2.6	72	9.6	6.5	3.1	3.6	5.3	3.2
19	3.7	5.3	5.1	1.3	2.5	58	8.4	6.4	2.7	4.6	3.4	3.2
20	3.8	4.5	6.2	1.3	2.6	56	7.5	5.6	3.1	3.0	3.3	3.2
21	3.9	5.3	7.7	1.4	2.5	59	7.6	5.2	2.9	2.2	3.2	3.2
22	3.7	5.3	8.0	1.9	2.4	66	13	5.1	3.5	2.2	3.4	3.1
23	3.4	5.3	6.5	1.8	2.3	80	16	5.9	4.1	2.3	7.0	3.0
24	3.6	5.3	5.5	1.9	2.2	115	13	6.4	3.4	2.1	5.0	3.0
25	3.9	4.2	4.6	1.9	2.5	100	12	6.0	5.3	2.2	3.9	3.0
26	4.4	4.4	4.5	1.9	2.9	71	12	4.7	6.9	2.4	7.2	3.0
27	4.9	3.5	4.6	1.8	3.1	64	22	4.3	5.9	2.5	9.0	3.0
28	4.9	3.9	4.5	1.8	2.9	49	29	4.6	3.2	2.5	7.0	3.0
29	4.0	5.0	4.5	1.7	---	32	30	5.1	2.6	2.7	4.1	2.9
30	3.8	5.0	4.6	1.8	---	17	21	4.8	2.3	4.1	3.5	2.8
31	4.5	---	4.3	1.9	---	12	---	4.3	---	3.3	5.7	---
TOTAL	117.4	136.4	151.7	68.2	69.4	1577.1	382.9	230.7	109.0	76.7	150.5	119.2
MEAN	3.79	4.55	4.89	2.20	2.48	50.9	12.8	7.44	3.63	2.47	4.85	3.97
MAX	4.9	5.3	8.0	4.1	3.1	130	30	16	6.9	4.8	9.0	11
MIN	3.1	3.4	3.8	1.3	1.8	2.8	7.5	4.3	2.3	1.6	2.4	2.8
AC-FT	233	271	301	135	138	3130	759	458	216	152	299	236
CFSM	.03	.03	.04	.02	.02	.38	.10	.06	.03	.02	.04	.03
IN.	.03	.04	.04	.02	.02	.44	.11	.06	.03	.02	.04	.03

CAL YR 1988 TOTAL 6475.41 MEAN 17.7 MAX 273 MIN .34 AC-FT 12840 CFSM .13 IN. 1.81
WTR YR 1989 TOTAL 3189.2 MEAN 8.74 MAX 130 MIN 1.3 AC-FT 6330 CFSM .07 IN. .89

05449500 IOWA RIVER NEAR ROWAN, IA

LOCATION.--Lat 42°45'36", long 93°37'23", in NW1/4 NE1/4 sec.25, T.92 N., R.24 W., Wright County, Hydrologic Unit 07080207, on left bank 10 ft downstream from bridge on county highway C38, 0.9 mi downstream from drainage ditch 123, 3.8 mi northwest of Rowan, 10.7 mi downstream from confluence of East and West Branches, and at mile 316.4.

DRAINAGE AREA.--429 mi^2.

PERIOD OF RECORD.--October 1940 to September 1976, June 1977 to current year.

REVISED RECORDS.--WSP 1308: 1942-43 (M). WSP 1438: Drainage area. WDR IA-80-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 1,143.35 ft above NGVD. Prior to Oct. 14, 1948, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Oct. 1, 2, 12, 13, 15-20, Oct. 22 to Nov. 3, Nov 5, 6, 16-24, and Nov. 26 to Mar. 26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--48 years (water years 1941-76, 1978-89), 211 ft^3/s, 6.68 in/yr, 152,900 acre-ft/yr; median of yearly mean discharges, 190 ft^3/s, 6.0 in/yr, 138,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,460 ft^3/s June 21, 1954, gage height, 14.88 ft; minimum daily discharge, 2.9 ft^3/s Jan. 21-23, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	1030	*480	(a) *8.24				

(a) Ice jam

Minimum discharge, 7.5 ft^3/s Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	23	16	13	23	17	57	106	24	16	15	13
2	16	23	17	13	14	15	49	91	24	16	14	13
3	15	24	16	14	12	16	47	80	30	16	14	15
4	14	25	16	13	11	15	45	71	24	15	14	20
5	14	23	15	16	11	18	45	67	21	14	14	19
6	14	21	15	15	12	26	41	65	20	14	14	19
7	14	19	15	15	13	30	40	58	19	14	15	20
8	14	17	14	14	14	43	43	52	19	13	15	18
9	14	18	15	14	14	58	44	49	19	13	15	15
10	14	18	14	14	14	170	39	48	19	13	14	14
11	14	17	14	13	15	440	38	44	18	15	15	13
12	14	19	14	14	16	470	42	41	18	16	15	12
13	15	18	14	12	17	360	42	39	17	15	15	11
14	15	19	13	13	16	310	40	37	18	18	16	11
15	15	22	14	12	15	290	42	34	18	15	15	11
16	16	22	14	12	16	240	42	33	17	14	16	11
17	16	23	14	12	15	230	41	31	17	13	14	11
18	16	23	14	12	16	240	41	30	16	19	14	10
19	16	23	14	14	15	200	40	32	16	17	15	10
20	17	22	16	17	14	150	40	31	16	18	16	9.9
21	17	22	17	18	14	120	38	29	15	17	14	9.4
22	18	22	16	19	13	105	48	27	16	15	14	9.5
23	18	22	14	18	13	110	61	26	17	14	13	9.4
24	17	22	13	19	15	125	98	40	16	14	13	9.0
25	18	21	12	20	17	150	83	41	18	14	15	8.9
26	19	20	11	18	19	190	70	29	21	14	18	8.7
27	20	18	12	17	18	206	65	26	23	14	18	8.2
28	21	17	12	16	18	191	84	23	22	13	17	7.9
29	22	16	13	15	---	133	119	36	20	14	18	7.8
30	22	16	14	18	---	92	128	30	17	14	16	7.8
31	23	---	14	21	---	71	---	26	---	14	15	---
TOTAL	515	615	442	471	420	4831	1652	1372	575	461	466	362.5
MEAN	16.6	20.5	14.3	15.2	15.0	156	55.1	44.3	19.2	14.9	15.0	12.1
MAX	23	25	17	21	23	470	128	106	30	19	18	20
MIN	14	16	11	12	11	15	38	23	15	13	13	7.8
AC-FT	1020	1220	877	934	833	9580	3280	2720	1140	914	924	719
CFSM	.04	.05	.03	.04	.03	.36	.13	.10	.04	.03	.04	.03
IN.	.04	.05	.04	.04	.04	.42	.14	.12	.05	.04	.04	.03

CAL YR 1988 TOTAL 19097 MEAN 52.2 MAX 531 MIN 11 AC-FT 37880 CFSM .12 IN. 1.66
WTR YR 1989 TOTAL 12182.5 MEAN 33.4 MAX 470 MIN 7.8 AC-FT 24160 CFSM .08 IN. 1.06

05451500 IOWA RIVER AT MARSHALLTOWN, IA

LOCATION.--Lat 42°03'57", long 92°54'27", in SE1/4 SE1/4 sec.23, T.84 N., R.18 W., Marshall County, Hydrologic Unit 07080208, on right bank 10 ft downstream from bridge on State Highway 14, 1,500 ft upstream from Burnett Creek, 2.2 mi upstream from Linn Creek, and at mile 222.8.

DRAINAGE AREA.--1,564 mi^2, including that of Burnett Creek.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1902 to September 1903, October 1914 to September 1927, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1915-18, 1919 (M), 1920, 1921-23 (M), 1924-27, 1933, 1934 (M), 1936, 1938, 1947 (M).

GAGE.--Water-stage recorder. Datum of gage is 853.10 ft above NGVD. See WSP 1728 for history of changes prior to Sept. 21, 1934.

REMARKS.--Estimated daily discharges: Nov. 28, Dec. 1 to Mar. 22, Aug. 3-15, and Sept. 27-30. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--71 years (water years 1903, 1915-27, 1933-89), 809 ft^3/s, 7.02 in/yr, 586,100 acre-ft/yr; median of yearly mean discharges, 690 ft^3/s, 6.0 in/yr, 500,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,000 ft^3/s June 4, 1918, gage height, 17.74 ft, from floodmark, from rating curve extended above 19,000 ft^3/s on basis of velocity-area study; maximum gage height, 19.77 ft March 19, 1979; minimum daily discharge, 4.7 ft^3/s Jan. 25, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	unknown	*1,300	(a) *13.90				

(a) HWM, ice jam

Minimum discharge, 31 ft^3/s Sept. 2, 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	40	50	80	70	88	43	299	160	277	160	64	38
2	40	50	68	72	80	45	265	176	180	126	62	34
3	39	51	71	70	76	45	238	185	145	116	60	33
4	41	56	72	70	72	47	217	180	193	99	61	40
5	42	50	74	68	68	48	198	170	255	80	58	38
6	42	51	70	72	63	52	179	159	183	74	58	38
7	41	51	62	75	58	58	170	147	149	75	58	47
8	39	53	52	92	56	120	184	140	135	75	57	53
9	39	60	45	110	54	400	179	134	227	73	57	182
10	41	57	51	105	54	850	169	129	226	74	57	200
11	39	54	62	110	54	540	161	122	162	70	55	144
12	39	67	64	94	56	300	152	115	142	61	57	127
13	38	70	66	98	54	230	146	110	124	61	56	103
14	40	67	67	100	52	170	140	109	115	60	57	96
15	39	78	71	94	50	110	135	105	109	60	58	90
16	42	101	68	90	47	130	133	100	104	57	59	80
17	46	117	66	84	44	170	133	95	98	53	55	75
18	49	100	66	90	43	270	134	99	97	74	49	69
19	49	85	70	110	41	460	131	104	93	61	58	64
20	50	81	73	172	40	400	128	95	87	60	54	64
21	52	85	75	155	38	380	127	88	84	62	47	65
22	47	84	76	150	37	340	132	88	83	61	44	71
23	49	84	74	140	36	341	132	83	82	60	45	57
24	48	76	75	125	36	330	132	102	80	56	47	66
25	48	70	73	110	37	333	130	204	93	56	47	63
26	48	89	76	120	39	372	129	366	106	52	56	64
27	47	86	78	140	40	436	141	395	109	47	45	71
28	47	68	76	160	42	428	176	265	110	43	39	80
29	47	74	74	170	---	417	193	197	134	64	38	84
30	48	82	72	145	---	386	164	163	176	67	35	80
31	50	---	68	110	---	347	---	216	---	64	38	---
TOTAL	1366	2147	2135	3371	1455	8598	4947	4801	4158	2201	1631	2326
MEAN	44.1	71.6	68.9	109	52.0	277	165	155	139	71.0	52.6	77.5
MAX	52	117	80	172	88	850	299	395	277	160	64	200
MIN	38	50	45	68	36	43	127	83	80	43	35	33
AC-FT	2710	4260	4230	6690	2890	17050	9810	9520	8250	4370	3240	4610
CFSM	.03	.05	.04	.07	.03	.18	.11	.10	.09	.05	.03	.05
IN.	.03	.05	.05	.08	.03	.20	.12	.11	.10	.05	.04	.06

CAL YR 1988 TOTAL 106806 MEAN 292 MAX 2000 MIN 26 AC-FT 211800 CFSM .19 IN. 2.54
WTR YR 1989 TOTAL 39136 MEAN 107 MAX 850 MIN 33 AC-FT 77630 CFSM .07 IN. .93

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1988 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 1988 to current year.
WATER TEMPERATURES: April 1988 to current year.
SUSPENDED-SEDIMENT DISCHARGE: April 1988 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at times of analysis. During periods of partial ice cover, sediment samples are collected in open water channel.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 780 microsiemens Aug. 8, 16, 18, 19, 21, 23, 1988; minimum daily, 380 microsiemens Sept. 10, 1989.
WATER TEMPERATURES: Maximum daily, 34.0°C July 27, 1988; minimum daily, 0.0°C on many days during winter period.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 406 mg/L Mar. 10, 1988; minimum daily mean, 2 mg/L Aug. 8,16, 1988.
SEDIMENT LOADS: Maximum daily, 932 tons Mar. 10, 1989; minimum daily, 0.20 ton Aug. 8,16, 1988.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 725 microsiemens Jan. 14; minimum daily, 330 microsiemens Sept. 10.
WATER TEMPERATURES: Maximum daily, 27.0°C July 30 to Aug. 1, Aug. 3, 4; minimum daily, 0.0°C on many days during winter period.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 406 mg/L Mar. 10; minimum daily mean, 8 mg/L Jan. 25-28.
SEDIMENT LOADS: Maximum daily, 932 tons Mar. 10; minimum daily, 1.2 tons Feb. 19,21.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, PERIOD APRIL TO SEPTEMBER 1988
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	420	530	460	400	420	---
2	---	---	---	---	---	---	---	380	490	440	469	---
3	---	---	---	---	---	---	440	590	500	460	---	---
4	---	---	---	---	---	---	440	460	500	---	480	---
5	---	---	---	---	---	---	520	---	500	400	---	---
6	---	---	---	---	---	---	455	---	---	---	480	---
7	---	---	---	---	---	---	500	490	500	420	760	---
8	---	---	---	---	---	---	400	455	480	400	780	---
9	---	---	---	---	---	---	---	520	450	420	500	---
10	---	---	---	---	---	---	420	---	420	---	---	---
11	---	---	---	---	---	---	440	400	420	420	480	---
12	---	---	---	---	---	---	440	460	460	420	---	---
13	---	---	---	---	---	---	440	---	---	420	520	---
14	---	---	---	---	---	---	---	460	420	---	760	490
15	---	---	---	---	---	---	---	460	---	---	---	---
16	---	---	---	---	---	---	490	---	440	440	780	---
17	---	---	---	---	---	---	420	460	440	440	---	---
18	---	---	---	---	---	---	425	440	420	440	780	---
19	---	---	---	---	---	---	480	440	---	420	780	---
20	---	---	---	---	---	---	380	460	440	---	---	---
21	---	---	---	---	---	---	460	---	---	410	780	---
22	---	---	---	---	---	---	420	---	420	410	---	---
23	---	---	---	---	---	---	530	---	460	---	780	---
24	---	---	---	---	---	---	500	440	440	420	500	---
25	---	---	---	---	---	---	520	440	---	440	440	512
26	---	---	---	---	---	---	---	500	440	440	---	515
27	---	---	---	---	---	---	520	450	440	---	---	---
28	---	---	---	---	---	---	420	---	---	440	480	---
29	---	---	---	---	---	---	410	490	---	500	480	560
30	---	---	---	---	---	---	480	490	420	440	---	506
31	---	---	---	---	---	---	---	---	---	---	---	---

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	570	---	591	---	---	---	---	---	---	520	---
2	479	528	542	---	---	---	---	654	---	507	---	---
3	495	---	---	---	---	---	---	---	---	---	---	---
4	513	493	490	---	---	---	---	---	651	---	---	---
5	520	---	---	---	---	---	607	643	---	---	---	---
6	522	519	497	---	---	---	618	---	---	436	542	500
7	494	---	---	---	---	---	---	---	---	---	---	---
8	---	513	466	---	---	---	---	---	---	---	---	---
9	---	510	---	---	667	---	---	---	588	---	562	---
10	---	540	---	---	---	---	---	---	---	---	---	330
11	---	---	---	---	---	---	632	660	---	482	---	---
12	506	---	---	---	---	---	---	---	---	---	586	---
13	---	---	---	---	---	---	629	---	---	---	594	460
14	---	491	536	725	---	---	---	618	669	---	---	470
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	547	532	480
17	---	500	---	---	---	---	---	---	---	---	---	---
18	---	---	610	---	---	---	637	520	---	450	578	---
19	527	---	---	---	679	---	592	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	455	365	430
21	492	526	---	---	---	---	---	---	---	---	---	---
22	495	---	---	510	---	---	---	---	---	441	---	---
23	---	624	---	---	---	474	626	573	573	---	516	465
24	488	---	---	---	---	460	---	540	---	---	---	---
25	525	---	---	---	---	---	---	---	478	473	---	---
26	510	---	---	629	---	---	---	---	---	---	---	485
27	535	---	---	---	636	---	---	---	---	---	---	---
28	---	507	---	---	---	---	---	---	---	490	---	485
29	---	---	---	---	---	---	615	669	514	---	---	---
30	---	---	---	---	---	---	---	---	---	485	---	510
31	540	---	---	---	---	487	---	---	---	---	---	---

WATER TEMPERATURE, DEGREES CELSIUS, PERIOD APRIL TO SEPTEMBER 1988
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	10.0	19.0	27.0	23.0	32.0	---
2	---	---	---	---	---	---	---	19.0	24.0	25.0	28.0	---
3	---	---	---	---	---	---	6.5	19.0	26.0	20.0	---	---
4	---	---	---	---	---	---	14.5	18.0	27.0	---	32.0	---
5	---	---	---	---	---	---	13.0	20.0	22.0	29.0	---	---
6	---	---	---	---	---	---	8.0	---	---	---	32.0	---
7	---	---	---	---	---	---	14.5	20.0	28.0	30.0	22.0	---
8	---	---	---	---	---	---	15.5	18.0	27.0	30.0	28.0	---
9	---	---	---	---	---	---	---	16.0	24.0	27.0	29.0	---
10	---	---	---	---	---	---	9.5	---	26.0	---	---	---
11	---	---	---	---	---	---	11.5	19.0	26.0	26.0	32.0	---
12	---	---	---	---	---	---	16.0	22.0	22.0	28.0	---	---
13	---	---	---	---	---	---	15.0	---	---	30.0	26.0	---
14	---	---	---	---	---	---	---	23.0	29.0	---	24.0	21.0
15	---	---	---	---	---	---	---	24.0	---	---	---	---
16	---	---	---	---	---	---	15.0	---	30.0	30.0	26.0	---
17	---	---	---	---	---	---	16.0	20.0	21.0	26.0	25.0	---
18	---	---	---	---	---	---	14.0	22.0	28.0	29.0	26.0	---
19	---	---	---	---	---	---	14.0	18.0	---	27.0	24.0	---
20	---	---	---	---	---	---	15.0	22.0	29.0	---	---	---
21	---	---	---	---	---	---	11.0	---	---	27.0	24.0	---
22	---	---	---	---	---	---	8.0	---	31.0	28.0	---	---
23	---	---	---	---	---	---	8.0	---	31.0	---	20.0	---
24	---	---	---	---	---	---	13.0	25.0	31.0	28.0	18.0	---
25	---	---	---	---	---	---	17.0	22.0	---	28.0	16.0	13.0
26	---	---	---	---	---	---	---	24.0	33.0	29.0	---	19.0
27	---	---	---	---	---	---	11.0	23.0	34.0	---	---	---
28	---	---	---	---	---	---	15.0	---	---	31.0	16.0	---
29	---	---	---	---	---	---	18.0	22.0	---	30.0	22.0	18.0
30	---	---	---	---	---	---	17.0	23.0	30.0	31.0	---	20.0
31	---	---	---	---	---	---	---	---	---	---	---	---

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	7.0	---	.0	---	---	---	---	---	---	29.0	---
2	16.5	6.5	2.0	---	---	---	---	14.0	---	30.0	---	---
3	14.5	---	---	---	---	---	---	---	---	---	---	---
4	11.5	10.0	.0	---	---	---	---	---	22.0	---	---	---
5	12.0	---	---	---	---	---	10.0	15.0	---	31.0	---	---
6	13.0	---	1.0	---	---	---	11.0	---	---	---	22.0	26.0
7	12.0	---	---	---	---	---	---	---	---	---	---	---
8	---	6.0	.0	---	---	---	---	---	---	---	---	---
9	9.0	5.0	---	---	.0	---	---	---	18.0	---	26.0	---
10	---	4.0	---	---	---	---	---	---	---	---	---	17.0
11	13.0	---	---	---	---	---	10.0	20.0	---	28.0	---	---
12	12.0	---	---	---	---	---	--	---	---	---	27.0	---
13	---	---	---	---	---	---	---	---	---	---	24.0	16.0
14	16.5	6.5	.0	.0	---	---	---	17.0	16.0	---	---	17.0
15	---	---	---	---	---	---	---	---	---	---	---	---
16	15.5	---	---	---	---	---	---	---	---	21.0	26.0	20.0
17	---	3.5	---	---	---	---	---	---	---	---	---	---
18	13.5	---	.0	---	---	---	9.0	20.0	---	25.0	27.0	---
19	9.5	---	---	---	.0	---	16.0	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	25.0	23.0	23.0
21	10.5	1.0	---	---	---	---	---	---	---	---	---	---
22	9.5	---	---	.0	---	---	---	---	---	23.0	---	---
23	---	.0	---	---	---	5.0	17.0	20.0	29.0	---	27.0	15.0
24	7.0	---	---	---	---	---	---	20.0	---	---	---	---
25	7.0	---	---	---	---	---	---	---	23.0	28.0	---	---
26	8.0	---	---	.0	---	---	---	---	---	---	---	16.0
27	8.0	---	---	---	.0	---	---	---	---	---	---	---
28	---	.0	---	---	---	---	---	---	---	25.0	---	18.0
29	---	---	---	---	---	---	13.0	26.0	26.0	---	---	---
30	---	---	---	---	---	---	---	---	---	28.0	---	21.0
31	9.0	---	---	---	---	6.5	---	---	---	---	---	---

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), PERIOD APRIL TO SEPTEMBER 1988

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	149	218	201	397	152	107	26	7.2	39	5.1	20	2.4
2	183	277	230	479	145	101	35	9.4	44	5.1	16	1.9
3	303	553	176	348	134	93	38	9.7	42	4.5	20	2.3
4	290	576	148	256	110	72	54	14	37	4.0	22	2.9
5	328	708	161	255	127	77	66	17	42	4.8	18	2.1
6	250	557	149	216	111	64	70	17	27	2.8	16	1.7
7	189	415	109	147	74	41	86	20	6	.60	18	1.7
8	185	396	102	138	65	36	72	17	2	.20	18	1.7
9	175	361	308	525	68	35	75	16	26	2.8	18	1.7
10	153	299	239	387	69	34	73	19	45	4.9	18	1.7
11	130	238	163	254	68	34	66	15	51	5.6	18	1.7
12	114	202	205	312	80	39	55	14	52	5.8	17	1.5
13	110	185	180	265	62	29	57	15	51	6.3	18	1.6
14	98	154	145	197	50	22	44	9.5	27	3.0	18	1.6
15	89	133	133	169	45	20	49	12	4	.41	16	1.4
16	75	106	134	161	66	28	48	12	2	.20	16	1.3
17	105	144	136	155	102	42	49	13	4	.37	14	.98
18	98	129	145	156	105	47	61	18	5	.45	16	1.2
19	74	93	131	134	105	44	67	20	7	.68	31	4.2
20	72	89	143	148	113	46	74	24	6	.57	13	1.6
21	65	80	165	162	109	41	60	17	7	.62	16	2.3
22	38	46	151	146	134	50	58	16	25	4.7	20	3.6
23	40	48	136	128	118	41	55	14	35	6.5	16	2.4
24	41	47	140	125	71	23	54	13	49	8.9	16	2.5
25	52	59	142	119	63	20	46	9.9	59	11	15	2.1
26	59	67	115	93	65	20	44	6.9	52	8.8	13	1.7
27	57	72	125	97	58	18	45	6.7	51	8.3	10	1.3
28	79	101	124	92	51	16	46	6.7	59	9.4	9	1.0
29	95	137	110	85	53	16	43	6.0	42	6.5	11	1.3
30	152	256	130	97	49	14	37	5.2	32	4.3	12	1.5
31	---	---	150	107	---	---	34	4.6	25	3.2	---	---
TOTAL	---	6746	---	6350	---	1270	---	404.8	---	130.40	---	56.88

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	12	1.3	18	2.4	46	9.9	58	11	13	3.1	29	3.4
2	32	3.5	17	2.3	47	8.6	56	11	16	3.5	18	2.2
3	28	2.9	23	3.2	47	9.0	54	10	17	3.5	16	1.9
4	30	3.3	55	8.3	48	9.3	53	10	22	4.3	15	1.9
5	25	2.8	50	6.7	48	9.6	56	10	23	4.2	14	1.8
6	33	3.7	27	3.7	49	9.3	54	10	30	5.1	10	1.4
7	37	4.1	28	3.9	57	9.5	62	13	38	6.0	11	1.7
8	37	3.9	52	7.4	71	10	57	14	37	5.6	18	5.8
9	36	3.8	58	9.4	64	7.8	66	20	33	4.8	102	110
10	37	4.1	48	7.4	56	7.7	58	16	20	2.9	406	932
11	37	3.9	37	5.4	53	8.9	55	16	15	2.2	290	423
12	29	3.1	34	6.2	51	8.8	53	13	16	2.4	140	113
13	30	3.1	28	5.3	50	8.9	52	14	14	2.0	55	34
14	42	4.5	24	4.3	48	8.7	53	14	14	2.0	41	19
15	34	3.6	29	6.1	47	9.0	52	13	14	1.9	38	11
16	31	3.5	40	11	46	8.4	52	13	15	1.9	35	12
17	33	4.1	47	15	47	8.4	52	12	13	1.5	33	15
18	32	4.2	37	10	47	8.4	56	14	13	1.5	57	42
19	21	2.8	35	8.0	47	8.9	62	18	11	1.2	141	175
20	19	2.6	36	7.9	46	9.1	58	27	13	1.4	117	126
21	33	4.6	55	13	47	9.5	41	17	12	1.2	95	97
22	12	1.5	44	10	46	9.4	28	11	13	1.3	73	67
23	10	1.3	37	8.4	64	13	18	6.8	14	1.4	53	49
24	12	1.6	37	7.6	54	11	13	4.4	13	1.3	52	46
25	25	3.2	37	7.0	49	9.7	8	2.4	14	1.4	57	51
26	32	4.1	46	11	48	9.8	8	2.6	29	3.1	66	66
27	31	3.9	48	11	49	10	8	3.0	43	4.6	93	109
28	27	3.4	75	14	42	8.6	8	3.5	41	4.6	98	113
29	22	2.8	64	13	43	8.6	18	8.3	---	---	73	82
30	17	2.2	47	10	54	10	20	7.8	---	---	45	47
31	16	2.2	---	---	55	10	10	3.0	---	---	38	36
TOTAL	---	99.6	---	238.9	---	287.8	---	348.8	---	79.9	---	2795.1

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	34	27	56	24	252	188	127	55	50	8.6	45	4.6
2	24	17	56	27	168	82	78	27	47	7.9	41	3.8
3	19	12	65	32	135	53	53	17	40	6.5	42	3.7
4	17	10	57	28	178	93	46	12	36	5.9	44	4.8
5	16	8.6	48	22	237	163	46	9.9	34	5.3	44	4.5
6	16	7.7	47	20	119	59	45	9.0	34	5.3	45	4.6
7	15	6.9	43	17	79	32	45	9.1	33	5.2	49	6.2
8	14	7.0	43	16	67	24	49	9.9	33	5.1	55	7.9
9	14	6.8	43	16	224	137	50	9.9	33	5.1	154	76
10	12	5.5	44	15	173	106	32	6.4	32	4.9	140	76
11	12	5.2	47	15	85	37	61	12	31	4.6	69	27
12	16	6.6	42	13	69	26	47	7.7	33	5.1	51	17
13	22	8.7	45	13	55	18	28	4.6	50	7.6	48	13
14	23	8.7	59	17	45	14	26	4.2	61	9.4	51	13
15	22	8.0	43	12	39	11	28	4.5	54	8.5	52	13
16	22	7.9	18	4.9	36	10	29	4.5	50	8.0	46	9.9
17	21	7.5	27	6.9	33	8.7	35	5.0	52	7.7	46	9.3
18	20	7.2	72	19	30	7.9	68	14	50	6.6	48	8.9
19	20	7.1	87	24	48	12	50	8.2	54	8.5	45	7.8
20	19	6.6	46	12	65	15	33	5.3	48	7.0	43	7.4
21	19	6.5	42	10	37	8.4	39	6.5	42	5.3	45	7.9
22	22	7.8	57	14	22	4.9	37	6.1	43	5.1	48	9.2
23	30	11	59	13	44	9.7	36	5.8	45	5.5	33	6.0
24	27	9.6	98	27	64	14	38	5.7	45	5.7	25	4.5
25	20	7.0	235	129	55	14	42	6.4	41	5.2	33	5.6
26	25	8.7	343	339	48	14	39	5.5	47	7.1	41	7.1
27	40	15	354	378	54	16	43	5.5	40	4.9	39	7.5
28	73	35	225	161	54	16	56	6.5	39	4.1	29	6.3
29	88	46	125	66	135	49	55	9.5	41	4.2	34	7.7
30	76	34	100	44	184	87	54	9.8	40	3.8	38	8.2
31	---	---	178	104	---	---	52	9.0	43	4.4	---	---
TOTAL	---	362.6	---	1638.8	---	1329.6	---	311.5	---	188.1	---	388.4
YEAR		8069.1										

05451500 IOWA RIVER AT MARSHALLTOWN, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, PERIOD APRIL TO SEPTEMBER 1988

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAY						
11...	1010	19.0	579	128	200	90
JUN						
23...	1050	23.0	129	95	33	98
AUG						
02...	1125	28.0	46	27	3.4	90

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR						
18...	1430	25.0	132	15	5.3	96
AUG						
16...	1425	25.0	55	44	6.5	97

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, PERIOD APRIL TO SEPTEMBER 1988

DATE	TIME	NUMBER OF SAM-PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)
MAY										
11...	0945	5	1	1	14	59	85	94	98	100
JUN										
23...	1020	5	1	2	11	64	92	98	99	100
AUG										
02...	1140	5	1	2	12	52	82	94	98	100

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAM-PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
APR											
18...	1445	5	0	1	11	64	88	96	99	100	--
AUG											
16...	1440	5	0	1	9	48	81	95	97	98	100

05451700 TIMBER CREEK NEAR MARSHALLTOWN, IA

LOCATION.--Lat 42°00'25", long 92°51'15", in SE1/4 SW1/4 sec.8, T.83 N., R.17 W., Marshall County, Hydrologic Unit 07080208, on left bank 20 ft downstream from bridge on U.S. Highway 30, 3.5 mi upstream from mouth, and 4.1 mi southeast of court house in Marshalltown.

DRAINAGE AREA.--118 mi^2.

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1708: 1950-55, 1957-59.

GAGE.--Water-stage recorder. Datum of gage is 849.44 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 26 to Jan. 27 and Feb. 1 to Mar. 25. Records good except for those Oct. 1 to Nov. 13, which are fair due to backwater from beaver dam and estimated periods, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--40 years, 72.7 ft^3/s, 8.37 in/yr, 52,670 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft^3/s Aug. 16, 1977, gage height, 17.69 ft; no flow for a few days in 1956 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 16.8 ft, discharge, 5,700 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 29	1200	*1,070	*9.94	No other peak above peak base.			

Minimum discharge, 0.55 ft^3/s Aug. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.9	2.0	6.0	4.7	100	3.2	7.8	15	5.5	2.1	.64	5.7
2	2.3	2.3	5.0	4.7	60	3.3	7.8	30	4.6	1.8	.69	4.5
3	2.2	1.9	4.5	4.7	30	3.3	7.7	40	4.3	1.6	.93	3.3
4	2.4	2.8	5.4	4.7	20	3.3	7.3	43	4.2	1.5	1.1	3.3
5	1.7	3.5	4.7	4.5	13	3.5	6.6	28	3.8	1.1	2.0	3.1
6	1.6	3.1	4.5	3.7	8.6	3.7	6.2	5.1	3.3	1.0	2.9	2.9
7	1.7	2.1	6.9	3.0	7.0	3.8	5.7	4.2	2.8	1.0	2.1	13
8	1.8	1.9	6.4	2.6	6.0	12	10	3.7	3.7	1.1	1.9	80
9	1.7	1.8	5.8	2.2	5.0	35	11	3.8	3.1	.77	1.7	155
10	1.2	1.5	6.2	2.0	4.5	120	8.8	3.2	3.1	.75	1.3	111
11	1.5	1.4	6.6	1.9	4.2	80	7.4	3.4	3.0	.75	.78	51
12	1.5	3.8	7.0	1.9	4.0	60	7.0	3.2	5.8	.87	.71	28
13	1.3	8.6	8.0	1.8	3.8	42	6.3	2.9	4.8	.90	2.0	19
14	1.5	3.2	8.0	1.8	3.7	30	5.5	2.7	4.0	.81	12	15
15	1.5	6.4	4.2	1.7	3.7	24	5.2	2.3	3.7	.79	9.1	12
16	1.5	19	4.5	1.7	3.6	19	5.2	2.4	3.3	.90	3.0	10
17	1.9	14	4.8	2.0	3.5	15	5.6	2.5	2.5	.87	1.5	8.6
18	3.0	5.4	4.9	3.0	3.5	12	5.4	3.1	2.0	11	1.4	7.2
19	1.5	5.2	4.9	4.0	3.5	10	4.7	5.2	2.5	22	2.4	6.7
20	1.7	4.3	4.9	4.0	3.4	8.0	4.5	4.3	1.8	8.7	5.8	5.9
21	2.5	3.5	4.9	4.0	3.4	9.0	4.5	2.7	1.4	3.8	7.5	4.9
22	3.5	3.8	4.9	3.9	3.4	13	5.2	1.9	1.1	2.4	3.1	4.5
23	2.6	2.8	4.8	3.5	3.4	15	6.3	1.8	1.3	1.2	3.9	3.5
24	2.3	2.8	4.8	3.0	3.3	14	5.8	82	1.3	1.0	3.7	3.4
25	2.2	2.7	4.8	2.6	3.3	13	4.9	42	2.4	1.1	1.9	2.7
26	3.0	4.1	4.7	3.3	3.3	13	4.5	15	5.9	1.0	29	2.6
27	2.7	3.7	4.7	15	3.3	13	4.4	9.0	20	.94	98	2.6
28	2.3	3.6	4.7	104	3.3	12	5.9	7.0	7.0	.88	26	2.9
29	3.4	4.5	4.7	756	---	12	7.4	6.8	3.8	.86	13	3.2
30	3.0	5.4	4.7	286	---	10	5.2	6.1	2.8	.80	9.6	3.2
31	2.1	---	4.7	152	---	8.8	---	5.7	---	.76	9.3	---
TOTAL	66.0	131.1	165.6	1393.9	317.7	623.9	189.8	388.0	118.8	75.05	258.95	578.7
MEAN	2.13	4.37	5.34	45.0	11.3	20.1	6.33	12.5	3.96	2.42	8.35	19.3
MAX	3.5	19	8.0	756	100	120	11	82	20	22	98	155
MIN	1.2	1.4	4.2	1.7	3.3	3.2	4.4	1.8	1.1	.75	.64	2.6
AC-FT	131	260	328	2760	630	1240	376	770	236	149	514	1150
CFSM	.02	.04	.05	.38	.10	.17	.05	.11	.03	.02	.07	.16
IN.	.02	.04	.05	.44	.10	.20	.06	.12	.04	.02	.08	.18

CAL YR 1988 TOTAL 8074.3 MEAN 22.1 MAX 330 MIN 1.1 AC-FT 16020 CFSM .19 IN. 2.55
WTR YR 1989 TOTAL 4307.50 MEAN 11.8 MAX 756 MIN .64 AC-FT 8540 CFSM .10 IN. 1.36

05451900 RICHLAND CREEK NEAR HAVEN, IA

LOCATION.--Lat 41°53'58", long 92°28'27", in SE1/4 NE1/4 sec.21, T.82 N., R.14 W., Tama County, Hydrologic Unit 07080208, on right bank 5 ft upstream from bridge on county highway, 0.6 mi northeast of Haven, and 2.8 mi upstream from mouth.

DRAINAGE AREA.--56.1 mi^2.

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1708: 1950-55, 1956 (M), 1957, 1958 (M), 1959.

GAGE.--Water-stage recorder. Datum of gage is 788.69 ft above NGVD. Prior to Oct. 1, 1971, at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 7 to Jan. 5, Jan. 8-28, and Feb. 2 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corp of Engineers data collection platform at station.

AVERAGE DISCHARGE.--40 years, 35.5 ft^3/s, 8.59 in/yr, 25,720 acre-ft/yr; median of yearly mean discharges, 31 ft^3/s, 7.5 in/yr, 22,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,000 ft^3/s May 28, 1974, gage height, 24.00 ft; no flow Jan. 22 to Feb. 2, 1977, and July 9, 10, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1918 reached a stage of 24.3 ft, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 9	2100	*720	(a) *16.57				

(a) Ice jam

No flow, July 9, 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.66	.96	.93	.39	3.0	.05	1.5	1.3	1.9	.22	.56	1.3
2	.68	1.0	1.1	.36	1.0	.05	1.6	1.4	1.6	.18	.52	.83
3	.59	1.0	1.1	.40	.70	.05	1.5	1.1	1.7	.16	.50	.98
4	.52	1.2	1.0	.50	.30	.50	1.4	1.1	1.4	.16	.51	1.1
5	.53	1.0	1.1	1.0	.15	.40	1.3	1.0	1.1	.11	.68	.86
6	.57	.85	1.1	63	.16	.20	1.2	.92	.88	.08	.54	.68
7	.53	.82	1.0	24	.20	.25	1.4	.83	.80	.08	.48	76
8	.51	.79	.84	4.5	.24	10	2.7	.77	.65	.04	.47	103
9	.56	.94	.70	2.3	.30	180	2.6	.75	.58	.00	.46	105
10	.56	.92	.60	1.6	.35	208	1.9	.73	.62	.00	.36	25
11	.44	.96	.46	1.1	.27	69	1.6	.71	.67	.04	.37	5.8
12	.44	1.3	.40	.90	.23	24	1.5	.56	2.2	.14	.37	4.1
13	.48	1.3	.45	.80	.20	7.2	1.5	.52	1.4	.10	.35	3.2
14	.64	1.3	.60	.85	.18	5.4	1.3	.55	.98	.08	.51	2.8
15	.41	1.4	.58	.76	.17	3.9	1.3	.47	.69	.07	.52	2.4
16	.46	1.6	.50	.64	.16	3.2	1.4	.44	.56	.05	.34	2.0
17	.76	1.2	.46	.74	.15	1.8	1.6	.34	.52	.10	.33	1.5
18	.78	1.2	.40	1.5	.15	2.2	1.6	.65	.44	28	.30	1.2
19	.73	1.1	.54	4.5	.14	1.9	1.5	1.3	.52	13	1.5	1.2
20	.79	1.0	.90	3.0	.14	2.1	1.4	.85	.56	2.9	.72	1.1
21	.86	.93	.60	1.5	.14	1.6	1.3	.47	.56	1.2	.37	.85
22	.82	.87	.62	1.3	.13	1.7	1.6	.40	.49	1.0	.32	.99
23	1.8	.95	.80	1.0	.08	1.9	1.9	.28	.49	1.0	2.7	.93
24	1.3	1.0	.90	.90	.08	1.8	1.7	105	.44	.90	.73	.79
25	1.5	1.1	.70	.84	.09	2.1	1.5	91	.75	.64	.70	.68
26	.52	1.8	.66	.80	.08	2.3	1.3	10	5.0	.71	5.0	.59
27	.92	1.7	.70	.76	.07	2.6	1.4	4.2	11	.65	5.5	.75
28	.85	1.1	.50	75	.06	2.9	2.0	3.2	1.7	.57	10	.99
29	.85	1.2	.47	351	---	2.8	1.7	2.9	.37	.52	50	.86
30	.94	1.2	.44	32	---	2.1	1.3	2.4	.24	.56	9.8	.73
31	1.0	---	.42	9.3	---	1.7	---	2.8	---	.59	2.7	---
TOTAL	23.00	33.69	21.57	587.24	8.92	543.70	47.5	238.94	40.81	53.85	98.21	348.21
MEAN	.74	1.12	.70	18.9	.32	17.5	1.58	7.71	1.36	1.74	3.17	11.6
MAX	1.8	1.8	1.1	351	3.0	208	2.7	105	11	28	50	105
MIN	.41	.79	.40	.36	.06	.05	1.2	.28	.24	.00	.30	.59
AC-FT	46	67	43	1160	18	1080	94	474	81	107	195	691
CFSM	.01	.02	.01	.34	.01	.31	.03	.14	.02	.03	.06	.21
IN.	.02	.02	.01	.39	.01	.36	.03	.16	.03	.04	.07	.23

CAL YR 1988 TOTAL 4615.73 MEAN 12.6 MAX 570 MIN .40 AC-FT 9160 CFSM .22 IN. 3.06
WTR YR 1989 TOTAL 2045.64 MEAN 5.60 MAX 351 MIN .00 AC-FT 4060 CFSM .10 IN. 1.36

05452000 SALT CREEK NEAR ELBERON, IA

LOCATION.--Lat 41°57'51", long 92°18'47", in NW1/4 NW1/4 sec.36, T.83 N., R.13 W., Tama County, Hydrologic Unit 07080208, at left downstream end of bridge on U.S. Highway 30, 2.0 mi upstream from Hog Run, 3.0 mi south of Elberon, and 9.0 mi upstream from mouth.

DRAINAGE AREA.--201 mi^2.

PERIOD OF RECORD.--October 1945 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946.

GAGE.--Water-stage recorder. Datum of gage is 781.58 ft above NGVD (Iowa Highway Commission bench mark). Prior to Oct. 15, 1945 and June 14, 1947 to Feb. 10, 1949, nonrecording gage on upstream side of bridge at present datum.

REMARKS.--Estimated daily discharges: Dec. 8 to Mar 10, Mar. 15-22, 25-27, Apr. 2, 8,9, 15, 16, 22, 23. Records good except those for estimated daily discharge, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--44 years, 130 ft^3/s, 8.78 in/yr, 94,180 acre-ft/yr; median of yearly mean discharges, 110 ft^3/s, 7.4 in/yr, 79,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 35,000 ft^3/s June 13, 1947, gage height, 17.6 ft from rating curve extended above 17,000 ft^3/s; maximum gage height, 20.00 ft June 15, 1982; minimum daily discharge, 0.85 ft^3/s Jan. 31, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 16, 1944 reached a stage of 19.9 ft, from floodmark at downstream side of bridge, discharge, about 30,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	1330	ice jam	*15.46	Sept. 8	0845	*2,420	14.75

Minimum discharge, 2.6 ft^3/s July 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.9	6.6	6.8	3.6	110	7.4	14	9.2	19	4.0	3.1	29
2	4.6	6.4	6.9	3.4	30	7.8	16	8.6	12	3.9	3.2	14
3	4.7	6.1	7.2	3.5	21	9.0	13	8.1	10	3.8	3.1	11
4	5.0	6.7	6.4	3.8	17	150	12	8.1	9.2	3.7	2.9	11
5	5.1	7.2	6.6	5.0	14	80	11	9.0	8.1	3.4	3.2	11
6	5.3	7.9	7.8	35	13	43	11	7.6	7.4	3.2	3.7	9.9
7	5.4	6.6	6.6	20	11	23	11	7.1	6.5	3.1	3.2	59
8	5.8	6.1	4.0	13	10	30	17	7.1	5.8	3.0	3.3	1290
9	5.7	6.1	5.0	10	9.0	70	13	7.8	5.6	2.9	3.2	357
10	5.7	6.9	4.3	8.7	8.5	900	11	7.3	5.7	2.8	3.5	145
11	5.9	5.8	3.8	8.0	8.0	231	10	6.5	5.7	2.8	3.8	77
12	4.9	7.3	4.2	7.8	8.6	124	11	6.1	14	2.9	3.5	49
13	4.8	9.4	4.5	7.4	9.4	61	9.9	6.0	21	3.1	3.5	48
14	5.8	7.8	4.3	7.2	8.4	39	9.6	5.8	11	3.0	4.4	53
15	5.5	8.7	3.6	7.5	8.0	20	9.8	5.7	7.7	3.1	4.2	34
16	5.6	16	3.2	7.6	7.6	15	10	5.6	6.8	3.2	4.2	20
17	6.1	10	3.4	9.0	7.2	13	10	5.1	6.5	3.1	4.3	17
18	6.7	8.9	3.7	25	7.2	15	9.7	5.2	5.7	5.8	4.4	16
19	6.0	7.1	3.9	90	7.4	14	9.3	6.8	5.3	11	8.6	15
20	5.9	6.5	4.4	50	7.8	12	9.5	7.1	5.1	7.7	15	13
21	6.9	4.5	4.2	30	8.0	11	8.8	5.3	4.7	4.7	6.6	12
22	6.7	4.7	4.3	20	7.4	12	9.4	4.5	4.3	4.1	4.2	12
23	8.8	7.4	5.0	25	6.8	18	10	4.4	4.3	4.1	7.3	10
24	7.3	7.0	4.3	17	7.2	21	12	22	4.4	3.8	8.2	9.4
25	6.3	6.4	3.7	15	9.0	19	10	449	4.6	3.5	8.1	9.3
26	5.9	9.0	3.9	13	9.4	17	8.7	48	11	3.1	11	8.5
27	6.2	9.8	3.7	20	8.4	17	8.4	21	18	3.0	21	7.8
28	6.6	6.3	3.4	60	8.0	18	13	16	8.7	2.9	7.8	8.0
29	5.9	6.2	3.2	400	---	18	12	14	5.4	3.4	31	7.6
30	5.3	7.0	3.7	320	---	16	9.5	13	4.3	3.9	11	7.1
31	7.0	---	3.6	200	---	14	---	16	---	3.1	11	---
TOTAL	182.3	222.4	143.6	1445.5	387.3	2045.2	329.6	753.0	247.8	119.1	215.5	2370.6
MEAN	5.88	7.41	4.63	46.6	13.8	66.0	11.0	24.3	8.26	3.84	6.95	79.0
MAX	8.8	16	7.8	400	110	900	17	449	21	11	31	1290
MIN	4.6	4.5	3.2	3.4	6.8	7.4	8.4	4.4	4.3	2.8	2.9	7.1
AC-FT	362	441	285	2870	768	4060	654	1490	492	236	427	4700
CFSM	.03	.04	.02	.23	.07	.33	.05	.12	.04	.02	.03	.39
IN.	.03	.04	.03	.27	.07	.38	.06	.14	.05	.02	.04	.44

CAL YR 1988 TOTAL 14947.4 MEAN 40.8 MAX 559 MIN 3.2 AC-FT 29650 CFSM .20 IN. 2.77
WTR YR 1989 TOTAL 8461.9 MEAN 23.2 MAX 1290 MIN 2.6 AC-FT 16780 CFSM .12 IN. 1.57

05452200 WALNUT CREEK NEAR HARTWICK, IA

LOCATION.--Lat 41°50'06", long 92°23'10", in SE1/4 SW1/4 sec.8, T.81 N, R.13 W., Poweshiek County, Hydrologic Unit 07080208, on right bank 5 ft downstream from bridge on county highway V21, 1.2 mi downstream from North Walnut Creek, 4.0 mi northwest of Hartwick, and 6.5 mi upstream from mouth.

DRAINAGE AREA.--70.9 mi^2.

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1558: 1950 (P), 1951-57.

GAGE.--Water-stage recorder. Datum of gage is 786.59 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 1-3, 10-19, Dec. 8 to Jan. 5, Jan. 8-29, Feb. 2 to Mar. 9, and Mar. 15-22. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--40 years, 44.1 ft^3/s, 8.45 in/yr, 31,950 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,100 ft^3/s July 2, 1983, gage height, 16.65 ft, from rating curve extended above 2,600 ft^3/s on basis of contracted-opening and flow-over-embankment measurement of peak flow; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of 17.7 ft, from information by local residents, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 29	----	Ice jam	*9.36	Sept. 7	2215	*607	8.42

Minimum daily discharge, 0.34 ft^3/s Aug. 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.70	.72	.86	.78	9.9	2.5	1.4	2.2	2.3	.61	.40	9.6
2	.72	.72	.88	.72	7.0	2.7	1.5	2.3	1.7	.61	.38	3.9
3	.64	.76	.86	.80	5.4	7.0	1.5	2.0	2.4	.61	.40	1.6
4	.59	.82	.85	.84	4.0	40	1.3	1.9	1.4	.59	.59	2.8
5	.59	.82	.85	7.0	3.1	50	1.3	1.9	1.2	.55	21	.90
6	.59	.82	.94	118	2.6	15	1.2	1.7	1.0	.53	3.0	.70
7	.59	.82	.82	80	2.4	9.0	1.3	1.6	.91	.53	.50	67
8	.59	.77	.70	20	2.5	30	5.1	1.6	.91	.53	.41	215
9	.60	1.3	.60	6.0	2.6	85	3.3	1.6	.90	.51	.38	306
10	.62	.92	.64	4.0	2.8	190	1.8	1.2	.93	.49	.38	141
11	.60	.71	.58	3.0	3.1	61	1.7	1.2	1.1	.77	.36	81
12	.58	1.3	.50	2.7	3.2	25	1.7	1.2	2.6	5.0	.36	53
13	.62	1.3	.56	2.5	3.0	11	1.6	1.2	1.6	.70	.37	41
14	.80	.93	.68	2.9	2.8	7.8	1.6	1.1	1.0	.56	.42	33
15	.56	6.4	.90	2.4	2.9	5.0	1.7	1.1	.89	.56	.43	26
16	.60	6.2	.58	2.1	2.7	2.5	1.7	1.0	.79	.54	.39	21
17	.66	1.5	.60	1.9	2.6	1.4	1.9	.99	.73	.51	.34	17
18	.68	1.1	.62	15	2.5	2.2	1.9	1.4	.71	30	.34	14
19	.70	.93	.66	10	2.7	1.7	2.0	4.4	.71	16	17	11
20	.66	.98	1.0	8.0	2.8	1.4	1.9	1.6	.66	.67	3.0	8.9
21	.66	.67	.80	3.5	2.8	1.5	1.8	1.1	.64	.43	.52	7.3
22	.73	.79	.82	3.0	2.5	1.4	2.2	1.1	.66	.51	.45	6.6
23	7.5	.88	.98	2.5	2.3	1.5	2.4	.99	.66	.57	.84	3.6
24	2.3	.87	.80	2.3	2.4	1.6	2.1	85	.67	.53	1.4	3.4
25	.91	.81	.70	2.1	2.9	1.7	2.0	58	.98	.50	1.8	3.5
26	.84	2.8	.72	2.0	3.2	2.0	2.8	12	16	.59	6.4	2.9
27	.77	1.7	.78	1.9	2.9	2.7	6.6	3.7	2.1	.60	27	2.4
28	.69	1.1	1.2	30	2.6	4.1	4.8	2.8	.91	.43	6.4	2.3
29	.68	1.2	.90	200	---	2.6	3.1	3.1	.71	.41	13	2.3
30	.72	.82	.80	51	---	1.8	2.0	2.3	.63	.42	20	2.7
31	.73	---	.76	17	---	1.5	---	2.1	---	.41	11	---
TOTAL	29.22	41.46	23.96	603.94	92.2	572.6	67.2	205.38	48.40	66.27	139.26	1091.40
MEAN	.94	1.38	.77	19.5	3.29	18.5	2.24	6.63	1.61	2.14	4.49	36.4
MAX	7.5	6.4	1.2	200	9.9	190	6.6	85	16	30	27	306
MIN	.56	.67	.50	.72	2.3	1.4	1.2	.99	.63	.41	.34	.70
AC-FT	58	82	48	1200	183	1140	133	407	96	131	276	2160
CFSM	.01	.02	.01	.27	.05	.26	.03	.09	.02	.03	.06	.51
IN.	.02	.02	.01	.32	.05	.30	.04	.11	.03	.03	.07	.57

CAL YR 1988 TOTAL 5023.18 MEAN 13.7 MAX 176 MIN .47 AC-FT 9960 CFSM .19 IN. 2.64
WTR YR 1989 TOTAL 2981.29 MEAN 8.17 MAX 306 MIN .34 AC-FT 5910 CFSM .12 IN. 1.56

05453000 BIG BEAR CREEK AT LADORA, IA

LOCATION.--Lat 41°44'58", long 92°10'55", in SW1/4 SW1/4 sec.7, T.80 N., R.11 W., Iowa County, Hydrologic Unit 07080208, on left bank 10 ft downstream from bridge on county highway V52, 0.4 mi south of Ladora, 1.2 mi downstream from Coats Creek, 2.8 mi upstream from Little Bear Creek, and 8.1 mi upstream from mouth.

DRAINAGE AREA.--189 mi^2.

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1966, published as Bear Creek at Ladora.

REVISED RECORDS.--WSP 1308: 1947 (M). WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 744.94 ft above NGVD. Oct. 1945 to June 26, 1946, non-recording gage and June 27, 1946 to Sept. 30, 1980, water-stage recorder at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 8 to Jan. 29, Feb. 2 to Mar. 10 and Mar. 15-21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--44 years, 121 ft^3/s, 8.69 in/yr, 87,660 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,500 ft^3/s Mar. 30, 1960, gage height, 14.60 ft, datum then in use; maximum gage height, 15.32 ft, datum then in use, Sept. 18, 1977; no flow for several days in 1956 and 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Jan. 29	0700	*1,400	(a) *17.62	No other peak greater than base discharge.			

(a) Ice jam

Minimum discharge, 0.90 ft^3/s Aug. 9, 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.0	5.7	7.1	3.4	26	5.8	8.8	9.7	10	3.7	1.5	156
2	3.5	2.9	4.2	3.1	17	6.0	8.3	9.7	8.9	3.3	1.3	40
3	2.9	3.9	4.6	3.5	9.0	15	8.0	8.4	17	3.2	1.4	13
4	2.7	4.1	3.6	3.7	6.0	200	7.7	8.4	16	2.8	1.6	9.0
5	2.8	3.3	3.9	15	5.4	100	7.3	8.1	11	2.6	1.7	8.9
6	3.1	3.4	4.5	60	4.9	45	6.7	8.3	5.8	2.3	1.4	6.5
7	3.0	3.7	3.8	45	4.5	50	6.7	7.5	4.8	2.1	1.4	11
8	4.0	3.6	3.5	50	4.2	70	11	7.2	30	2.0	1.2	172
9	3.6	4.2	3.1	20	4.0	700	13	7.2	5.7	1.8	1.0	601
10	2.5	4.6	3.3	9.0	4.5	500	9.9	6.8	5.0	1.7	1.0	224
11	2.4	4.3	2.7	7.6	5.1	198	7.8	6.2	5.9	1.8	1.1	130
12	2.3	6.2	3.2	6.6	5.8	63	6.9	5.9	12	23	1.0	68
13	2.8	6.8	4.0	6.1	6.2	22	6.3	5.6	11	9.2	1.1	49
14	3.1	6.6	4.3	6.6	5.8	13	5.8	5.4	7.3	5.8	3.8	35
15	3.0	7.5	3.2	6.8	5.6	8.0	5.6	5.2	6.0	5.1	1.7	27
16	2.7	20	2.5	6.2	5.2	6.8	5.9	5.0	5.1	4.7	1.3	22
17	4.7	14	2.8	6.5	5.0	6.2	6.1	5.0	4.5	3.8	1.7	19
18	3.9	7.8	3.5	7.4	5.4	5.8	6.3	4.9	4.2	34	1.1	16
19	3.4	5.8	5.0	7.0	5.6	6.6	6.2	7.1	3.9	116	4.8	14
20	3.8	5.1	4.6	6.6	5.8	7.7	6.4	8.7	3.2	26	14	12
21	3.6	4.5	3.5	6.0	5.8	8.9	5.9	5.5	2.9	10	4.6	11
22	3.9	4.4	3.7	8.0	5.4	11	6.2	5.5	2.7	6.7	2.1	10
23	5.3	5.4	4.0	8.4	5.0	11	7.5	5.8	3.1	9.1	3.7	9.9
24	8.5	5.8	3.6	7.0	5.4	11	7.1	203	2.6	5.3	19	9.0
25	6.7	4.8	3.2	6.4	6.0	10	5.8	191	5.2	3.1	8.1	8.6
26	4.6	7.7	3.7	6.2	6.2	11	5.5	56	22	2.8	16	8.3
27	4.0	11	6.0	8.0	5.8	11	16	19	11	2.3	8.0	7.6
28	3.3	7.9	4.5	20	6.0	12	13	14	5.8	2.3	6.6	7.4
29	3.8	5.8	3.5	400	---	12	16	13	5.1	1.9	5.5	7.1
30	3.1	5.5	3.7	198	---	11	9.7	11	4.2	1.8	4.1	7.1
31	3.6	---	3.5	55	---	9.5	---	8.8	---	1.6	14	---
TOTAL	114.6	186.3	120.3	1003.1	186.6	2147.3	243.4	672.9	241.9	301.8	136.8	1719.4
MEAN	3.70	6.21	3.88	32.4	6.66	69.3	8.11	21.7	8.06	9.74	4.41	57.3
MAX	8.5	20	7.1	400	26	700	16	203	30	116	19	601
MIN	2.3	2.9	2.5	3.1	4.0	5.8	5.5	4.9	2.6	1.6	1.0	6.5
AC-FT	227	370	239	1990	370	4260	483	1330	480	599	271	3410
CFSM	.02	.03	.02	.17	.04	.37	.04	.11	.04	.05	.02	.30
IN.	.02	.04	.02	.20	.04	.42	.05	.13	.05	.06	.03	.34

CAL YR 1988 TOTAL 11205.7 MEAN 30.6 MAX 1000 MIN 1.6 AC-FT 22230 CFSM .16 IN. 2.21
WTR YR 1989 TOTAL 7074.4 MEAN 19.4 MAX 700 MIN 1.0 AC-FT 14030 CFSM .10 IN. 1.39

05453100 IOWA RIVER AT MARENGO, IA

LOCATION.-- Lat 41°48'48" long 92°03'51", in SE1/4 NE1/4 sec.24, T.81 N., R.11 W., Iowa County, Hydrologic Unit 07080208, on left bank 5 ft upstream from bridge on State Highway 411, 1.0 mi downstream from Big Bear Creek, 0.8 mi north of Marengo, 4.6 mi upstream from Hilton Creek, and at mile 139.1.

DRAINAGE AREA.--2,794 mi^2.

PERIOD OF RECORD.--October 1956 to current year. Monthly discharge only for some periods, published in WSP 1728.

REVISED RECORDS.--WSP 1558: 1957.

GAGE.--Water-stage recorder. Datum of gage is 720.52 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 8 to Mar. 21 and Mar. 23. Records good except those for estimated daily discharges, which are fair. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--33 years, 1,779 ft^3/s, 8.65 in/yr , 1,289,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,800 ft^3/s Mar. 31, 1960, gage height, 19.21 ft; maximum gage height, 19.79 ft July 12, 1969; minimum daily discharge, 24 ft^3/s Jan. 29 to Feb. 1, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	2030	3,260	(a) *14.97	Sept. 9	1130	*3,310	10.57

(a) Ice jam

Minimum discharge, 74 ft^3/s Aug. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	105	90	103	81	700	120	614	290	311	172	102	206
2	100	90	105	79	569	123	582	297	288	179	99	193
3	97	90	115	78	505	126	528	271	349	196	97	144
4	90	92	112	77	475	138	478	277	338	192	96	134
5	89	94	109	95	374	148	425	288	288	178	94	126
6	88	95	115	452	300	157	386	283	266	190	101	121
7	89	95	118	359	249	160	362	279	309	157	101	126
8	89	95	82	343	246	172	375	275	319	152	96	1220
9	90	92	92	262	237	486	381	260	250	147	90	2790
10	94	93	93	209	226	1870	376	246	231	140	84	1580
11	92	93	104	168	211	2500	358	235	233	137	81	863
12	88	98	105	136	201	2610	341	222	305	148	77	668
13	86	104	96	126	195	2360	326	216	297	144	80	537
14	84	105	94	126	186	2050	324	208	270	138	90	429
15	85	113	102	124	172	1600	301	200	234	136	92	356
16	86	137	99	122	162	1320	292	195	222	135	86	302
17	88	143	96	122	155	1150	284	189	197	133	92	255
18	87	135	93	123	153	2050	277	190	192	184	86	226
19	84	141	90	128	148	2190	259	191	188	250	90	201
20	85	140	90	197	148	1870	253	197	184	222	137	181
21	88	132	89	356	146	1600	247	194	178	185	122	162
22	87	121	87	286	142	1040	244	187	171	161	111	151
23	96	117	85	261	135	779	246	180	167	155	112	142
24	101	117	87	254	132	769	245	231	158	147	115	133
25	103	117	94	261	128	646	238	670	160	131	122	127
26	97	127	89	237	127	584	228	740	184	123	113	122
27	93	130	95	233	123	572	231	397	224	122	112	123
28	91	121	101	258	123	604	237	363	210	113	132	119
29	90	120	95	1350	---	673	247	444	191	109	153	115
30	90	123	88	1470	---	677	258	422	176	105	183	115
31	90	---	84	1140	---	645	---	352	---	103	191	---
TOTAL	2822	3360	3007	9513	6668	31789	9943	8989	7090	4784	3337	11967
MEAN	91.0	112	97.0	307	238	1025	331	290	236	154	108	399
MAX	105	143	118	1470	700	2610	614	740	349	250	191	2790
MIN	84	90	82	77	123	120	228	180	158	103	77	115
AC-FT	5600	6660	5960	18870	13230	63050	19720	17830	14060	9490	6620	23740
CFSM	.03	.04	.03	.11	.09	.37	.12	.10	.08	.06	.04	.14
IN.	.04	.04	.04	.13	.09	.42	.13	.12	.09	.06	.04	.16

CAL YR 1988 TOTAL 213876 MEAN 584 MAX 4360 MIN 81 AC-FT 424200 CFSM .21 IN. 2.85
WTR YR 1989 TOTAL 103269 MEAN 283 MAX 2790 MIN 77 AC-FT 204800 CFSM .10 IN. 1.37

05453510 CORALVILLE LAKE NEAR CORALVILLE, IA

LOCATION.--Lat 41°43'29", long 91°31'40", in SW1/4 NE1/4 sec.22, T.80 N., R.6 W., Johnson County, Hydrologic Unit 07080208, at outlet works at left end of Coralville Dam on Iowa River, 2.3 mi upstream from Rapid Creek, 4.3 mi northeast of Coralville Post Office and at mile 83.3.

DRAINAGE AREA.--3,115 mi^2.

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1957. Storage began in September 1958. Releases controlled by three gates, 8.33 ft wide and 20 ft high, into forechamber of 23-ft diameter concrete conduit through dam. Inlet invert elevation at 646.0 ft. No dead storage. Maximum design discharge through gates is 20,000 ft^3/s. Ungated spillway is concrete overflow section 500 ft in length at elevation 712 ft above NGVD, contents, 469,000 acre-ft, surface area, 24,800 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Normal operation will maintain an elevation of 670 ft Feb. 15 to June 15, surface area, 1,820 acres, 680 ft June 15 to Sept. 25, surface area, 4,900 acres, 683 ft Sep. 25 to Dec. 15, and 680 ft December 15 to Feb. 1 with a minimum release of 150 ft^3/s and maximum release of 10,000 ft^3/s Dec. 15 to May 1 and 6,000 ft^3/s May 1 to Dec. 15. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 472,000 acre-ft July 21, 1969, elevation, 711.85 ft; minimum daily contents, 456 acre-ft Jan. 15, 1975; minimum elevation, 658.77 ft Mar. 10, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 48,600 acre-ft Sept. 10; maximum elevation, 648.10 ft Sept. 9-11; minimum daily contents, 22,600 acre-ft March 1; minimum elevation, 677.90 ft Nov. 11, 12.

Capacity table (elevation, in feet, and contents, in acre-ft)

655	5,000	683	55,000	700	232,000
670	10,600	685	69,000	705	327,000
675	21,000	690	108,000	710	427,000
680	40,300	695	162,000	712	469,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25900	23700	24600	23600	31300	22600	23700	33300	45800	44700	43900	42300
2	25700	23800	24700	23600	30700	22700	23800	33900	46100	44700	43900	42300
3	25600	23700	24600	23500	30700	23100	23900	34300	46700	44800	43600	42200
4	25600	23400	24600	23400	30900	23800	23900	35100	47100	44800	43300	42400
5	25500	23400	24700	23600	31000	24100	23800	35300	47300	44800	43300	42400
6	25400	22900	24700	24100	31000	24200	23900	35600	47100	44800	43300	42300
7	25300	22800	24600	24700	31000	24400	24100	35900	46600	44900	43300	42900
8	25200	22800	24500	25200	31000	24600	24500	36300	46500	44900	43300	46100
9	25200	23000	24400	25300	31100	25100	24700	36900	46000	44700	42200	48200
10	25200	22900	24400	25600	31000	25300	24800	37100	45700	44500	41900	48600
11	25200	22700	24200	26200	30900	25500	24900	37500	45600	44500	41700	47200
12	24400	22700	24100	26300	30800	25600	24900	37800	45900	44400	41500	44700
13	24200	22700	24100	26500	30800	26200	24600	37800	44800	44200	41300	44300
14	24300	22900	24000	26600	30600	26400	24600	38000	44600	43900	41600	44300
15	24100	23100	23900	26600	30000	25800	24400	38100	44500	44000	41600	44600
16	24000	23500	23800	26800	28900	25200	24400	38200	44500	43900	41500	44700
17	24200	23700	23600	26800	28100	23900	24400	38200	44300	43700	41200	44800
18	24100	23900	23600	26900	27500	23600	24700	38500	44300	44300	41000	44700
19	24100	23900	23500	27000	26900	24000	25000	38500	44300	44600	41200	44600
20	24100	23900	23500	26900	26300	24200	25200	38500	44200	44500	41200	44500
21	24000	23900	23400	27100	25700	23900	25400	38600	44000	44700	41300	44600
22	24200	24100	23400	27400	25000	24400	26000	38700	44100	44700	41400	45800
23	24400	24100	23400	27900	24500	24500	27100	38800	44000	44900	41400	44700
24	24100	24100	23500	28100	24100	24600	28900	39200	43900	44900	41400	44000
25	24200	24200	23400	28500	23500	24200	29400	39200	43900	45000	41300	43900
26	24200	24400	23500	28900	23000	24200	30300	40600	44100	45000	41700	44000
27	24500	24800	23500	29500	22800	24200	30800	41400	44600	44700	41600	44100
28	24100	24500	23600	30000	22700	24400	31900	41900	44600	44500	41800	43900
29	24000	24700	23700	31100	---	23900	32300	42400	44600	44300	41700	43900
30	23800	24800	23700	32000	---	23900	32700	43400	44700	44300	41700	43900
31	23700	---	23600	32300	---	23600	---	44400	---	44000	42000	---
MEAN	24600	23600	24000	26800	28300	24400	26100	38200	45100	44500	42000	44400
MAX	25900	24800	24700	32300	31300	26400	32700	44400	47300	45000	43900	48600
MIN	23700	22700	23400	23400	22700	22600	23700	33300	43900	43700	41000	42200

CAL YR 1988 MEAN 25500 MAX 35100 MIN 14700
WTR YR 1989 MEAN 32700 MAX 48600 MIN 22600

05454000 RAPID CREEK NEAR IOWA CITY, IA

LOCATION.--Lat 41°41'19", long 91°29'15", in NE1/4 NE1/4 sec.36. T.80 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on left bank 80 ft upstream from bridge on State Highway 1, 3.5 mi northeast of Iowa City, and 4.7 mi upstream from mouth.

DRAINAGE AREA.--25.3 mi^2.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1558: 1941 (M), 1943 (P), 1944 (M), 1946. WSP 1708: 1951 (P), 1952. WDR IOWA 1967: Drainage area.

GAGE.--Water-stage recorder and concrete control with sharp-crested weir. Datum of gage is 673.72 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 1 to Jan. 4, Jan 14-28, and Feb. 2 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--52 years, 15.9 ft^3/s, 8.53 in/yr, 11,520 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,100 ft^3/s May 23, 1965, gage height, 14.10 ft, from contracted-opening measurement of peak flow; maximum gage height, 14.93 ft July 17, 1972; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 9	2105	310	(a) *6.80	Sept. 9	0500	*317	6.63

(a) Ice jam.

No flow many days during year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.06	.00	2.2	.11	.55	4.5	9.2	.34	.00	3.5
2	.00	.00	.06	.00	.70	.10	.57	6.0	3.3	.32	.00	.90
3	.00	.00	.05	.00	.25	5.0	.54	4.5	3.3	.29	1.9	.42
4	.00	.20	.04	.00	.18	20	.53	4.0	2.6	.23	6.2	.23
5	.00	.15	.04	.00	.20	10	.48	4.1	1.5	.13	.57	.15
6	.00	.13	.04	.00	.15	6.0	.45	2.9	.98	.01	.21	.12
7	.00	.14	.05	.00	.12	3.0	.43	2.4	.78	.00	.07	.15
8	.00	.11	.04	.00	.10	5.0	.82	2.1	.60	.00	.01	6.1
9	.00	.10	.03	.00	.11	50	.78	3.7	.54	.00	.00	71
10	.00	.10	.02	.00	.12	69	.62	2.8	.51	.00	.00	7.7
11	.00	.09	.02	.00	.10	13	.52	2.0	.51	.00	.00	3.5
12	.00	.25	.02	.00	.10	4.6	.49	1.7	3.6	.00	.00	2.0
13	.00	.30	.02	.00	.12	1.9	.44	1.5	7.5	.00	.00	1.6
14	.00	.20	.02	.01	.11	1.5	.43	1.3	3.0	.00	.02	1.2
15	.00	.14	.01	.08	.13	1.4	.41	1.1	2.0	.00	.43	.84
16	.00	.17	.01	.15	.14	.89	.40	.98	1.4	.00	.01	.65
17	.00	.12	.01	.17	.13	.71	.41	.86	1.1	.00	.00	.52
18	.00	.09	.01	.25	.12	.56	.44	.92	.84	.00	.00	.43
19	.00	.06	.00	.35	.11	.50	.45	1.1	.72	.00	.00	.33
20	.00	.04	.00	.33	.12	.51	.43	.89	.57	.00	.00	.28
21	.00	.03	.00	.28	.13	.50	.39	.84	.47	.00	.00	.24
22	.00	.02	.00	.24	.11	.48	.72	.81	.38	.00	.03	.17
23	.50	.01	.00	.22	.10	.51	42	.73	.30	.00	6.6	.13
24	.07	.00	.00	.21	.10	.56	10	.81	.24	.00	1.3	.13
25	.02	.01	.00	.22	.11	.59	5.8	4.1	.20	.00	.47	.11
26	.00	.04	.00	.23	.13	.63	4.7	1.6	.22	.00	1.0	.09
27	.00	.08	.00	.21	.11	.74	4.9	.74	1.7	.00	.80	.08
28	.00	.04	.00	3.5	.12	.96	4.1	.57	2.3	.00	.39	.05
29	.00	.07	.00	28	---	1.1	3.3	.60	.68	.00	.31	.08
30	.00	.06	.00	7.5	---	.85	2.5	.59	.40	.00	.14	.06
31	.00	---	.00	3.3	---	.66	---	.55	---	.00	.13	---
TOTAL	0.59	2.75	0.55	45.25	6.22	201.36	88.60	61.29	51.44	1.32	20.59	102.76
MEAN	.019	.092	.018	1.46	.22	6.50	2.95	1.98	1.71	.043	.66	3.43
MAX	.50	.30	.06	28	2.2	69	42	6.0	9.2	.34	6.6	71
MIN	.00	.00	.00	.00	.10	.10	.39	.55	.20	.00	.00	.05
AC-FT	1.2	5.5	1.1	90	12	399	176	122	102	2.6	41	204
CFSM	.00	.00	.00	.06	.01	.26	.12	.08	.07	.00	.03	.14
IN.	.00	.00	.00	.07	.01	.30	.13	.09	.08	.00	.03	.15

CAL YR 1988 TOTAL 2154.15 MEAN 5.89 MAX 250 MIN .00 AC-FT 4270 CFSM .23 IN. 3.17
WTR YR 1989 TOTAL 582.72 MEAN 1.60 MAX 71 MIN .00 AC-FT 1160 CFSM .06 IN. .86

05454300 CLEAR CREEK NEAR CORALVILLE, IA

LOCATION.--Lat 41°40'36", long 91°35'55", in NE1/4 SE1/4 sec.1, T.79 N., R.7 W., Johnson County, Hydrologic Unit 07080209, on left bank about 100 ft upstream from bridge on county highway, 1.1 mi west of post office in Coralville, 1.5 mi downstream from Deer Creek and 2.7 mi upstream from mouth.

DRAINAGE AREA.--98.1 mi^2.

PERIOD OF RECORD.--October 1952 to current year. Monthly discharge only for some periods, published in WSP 1728.

GAGE.--Water-stage recorder. Datum of gage is 647.48 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Jan. 7, 1957, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 8 to Mar. 22 and June 30 to July 18. Records good except those for period with ice effect, Dec. 8 to Mar. 22, which is fair, and those for period of no gage height record, June 30 to July 18, which is poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--37 years, 65.4 ft^3/s, 9.05 in/yr, 47,380 acre-ft/yr; median of yearly mean discharges, 52 ft^3/s, 7.2 in/yr, 37,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,900 ft^3/s June 15, 1982, gage height, 14.61 ft; no flow Jan. 18 to Feb. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	0815	*1,040	*7.99	No other peak greater than base discharge.			

Minimum discharge, 1.10 ft^3/s Oct. 15, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	1.6	3.5	2.6	26	2.8	5.6	9.6	277	3.5	1.8	32
2	1.4	1.6	3.2	2.2	11	2.9	5.4	8.4	45	3.0	1.7	11
3	1.3	1.7	2.9	2.0	8.0	6.7	6.5	5.4	120	2.8	2.2	4.1
4	1.2	2.0	3.3	1.7	4.2	94	5.5	5.2	47	2.6	2.4	3.0
5	1.2	2.1	3.1	2.7	3.4	41	5.0	4.9	23	2.6	1.7	2.8
6	1.3	2.1	3.4	16	3.0	25	4.7	3.5	16	2.4	1.7	3.2
7	1.3	2.2	2.5	8.3	2.7	24	4.1	3.1	12	2.3	1.7	5.8
8	1.3	2.1	2.0	6.4	2.5	27	11	2.8	10	2.3	1.7	478
9	1.3	2.8	1.9	6.0	2.1	96	11	11	8.9	2.5	1.5	650
10	1.3	3.0	2.0	6.4	2.2	115	7.2	5.0	8.0	2.4	1.5	162
11	1.2	2.5	2.5	5.7	2.4	44	5.3	3.0	6.0	2.3	1.6	64
12	1.3	4.6	3.2	4.6	2.6	31	4.8	2.5	26	2.2	1.6	40
13	1.3	3.0	3.2	4.3	2.8	18	4.1	2.2	12	2.2	1.6	33
14	1.2	3.0	2.8	4.4	2.8	12	3.4	2.2	7.1	2.1	18	27
15	1.3	3.1	2.7	5.0	3.1	10	3.7	2.2	5.2	2.0	23	22
16	1.2	36	2.2	4.5	2.7	10	3.4	2.1	4.4	1.9	8.6	17
17	1.5	21	2.1	5.1	2.4	10	3.8	1.9	3.8	1.9	3.1	14
18	1.3	6.2	2.3	5.7	3.2	9.0	4.7	2.0	3.4	2.0	2.5	11
19	1.5	3.8	3.0	5.5	3.1	9.5	4.5	2.0	3.1	20	3.0	9.5
20	2.2	2.9	3.9	5.6	3.6	10	4.7	1.8	2.9	6.7	5.6	7.8
21	1.9	2.6	2.9	5.7	3.5	9.4	4.3	1.7	2.8	3.6	4.3	6.2
22	1.9	2.9	3.3	7.5	2.6	9.0	7.0	1.7	2.6	3.3	2.9	5.2
23	7.7	2.7	3.5	7.8	2.0	6.7	116	1.5	2.5	4.1	38	4.8
24	3.5	2.8	2.9	6.3	2.1	6.6	29	2.5	2.4	3.4	11	4.6
25	2.6	2.7	2.6	7.2	2.6	6.7	13	211	2.4	2.6	5.5	4.3
26	1.9	4.1	3.4	7.3	3.1	7.1	9.0	29	2.3	2.3	21	4.6
27	1.8	4.9	4.7	6.4	3.2	7.5	9.3	8.6	59	2.1	20	3.7
28	1.7	4.2	2.7	9.0	3.0	11	6.8	4.9	57	2.0	6.9	3.5
29	1.7	2.9	3.0	109	---	11	6.6	3.9	13	1.9	3.9	3.4
30	1.7	2.6	3.6	82	---	8.3	4.7	3.4	6.0	2.0	3.1	3.2
31	1.7	---	3.2	37	---	6.9	---	3.1	---	2.1	12	---
TOTAL	55.1	139.7	91.5	389.9	115.9	688.1	314.1	352.1	790.8	99.1	215.1	1640.7
MEAN	1.78	4.66	2.95	12.6	4.14	22.2	10.5	11.4	26.4	3.20	6.94	54.7
MAX	7.7	36	4.7	109	26	115	116	211	277	20	38	650
MIN	1.2	1.6	1.9	1.7	2.0	2.8	3.4	1.5	2.3	1.9	1.5	2.8
AC-FT	109	277	181	773	230	1360	623	698	1570	197	427	3250
CFSM	.02	.05	.03	.13	.04	.23	.11	.12	.27	.03	.07	.56
IN.	.02	.05	.03	.15	.04	.26	.12	.13	.30	.04	.08	.62

CAL YR 1988 TOTAL 8103.67 MEAN 22.1 MAX 816 MIN .98 AC-FT 16070 CFSM .23 IN. 3.07
WTR YR 1989 TOTAL 4892.1 MEAN 13.4 MAX 650 MIN 1.2 AC-FT 9700 CFSM .14 IN. 1.86

05454500 IOWA RIVER AT IOWA CITY, IA

LOCATION.--Lat 41°39'24", long 91°32'27", in SE1/4 SE1/4 sec.9, T.79 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on right bank 25 ft downstream from Hydraulics Laboratory of University of Iowa in Iowa City, 175 ft downstream from University Dam, 0.8 mi upstream from Ralston Creek, 3.6 mi downstream from Clear Creek, and at mile 74.2.

DRAINAGE AREA.--3,271 mi^2.

PERIOD OF RECORD.--June 1903 to current year. Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder. Datum of gage is 29.00 ft above Iowa City datum, and 617.27 ft above NGVD. Oct. 1, 1934 to Sept. 30, 1972, at datum 10.00 ft higher. See WSP 1708 for history of changes prior to Oct. 1, 1964.

REMARKS.--Estimated daily discharges: Jan. 31 to Feb. 1, and Feb. 4-27. Records good except those for estimated daily discharges, which are fair. Slight fluctuation at low stages caused by powerplant above station. Flow regulated by Coralville Lake (station 05453510), 9.1 mi upstream, since Sept. 17, 1958. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--86 years, 1,712 ft^3/s, 7.11 in/yr, 1,240,000 acre-ft/yr; median of yearly mean discharges, 1,460 ft^3/s, 6.1 in/yr, 1,060,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,500 ft^3/s June 8, 1918, gage height, 19.6 ft, from graph based on gage readings, site and datum then in use; minimum daily discharge, 29 ft^3/s Oct. 21, 22, 1916, regulated.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 17, 1881, reached a stage of 21.1 ft, from floodmarks at site and datum in use 1913-21, from information by local resident, discharge, 51,000 ft^3/s. Maximum stage known since at least 1850, about 3 ft higher than that of July 17, 1881, occurred in June 1851, discharge, 70,000 ft^3/s, estimated.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,240 ft^3/s Sept. 9, gage height, 13.87 ft; minimum daily discharge, 114 ft^3/s Dec. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	157	156	142	124	809	159	667	209	530	149	146	219
2	157	153	145	119	751	133	608	195	234	150	145	172
3	154	167	143	120	424	151	603	190	338	147	175	161
4	151	284	141	120	250	509	597	196	303	147	177	153
5	147	156	144	133	250	263	593	189	264	149	151	149
6	148	148	143	244	240	158	465	181	347	148	143	150
7	145	151	141	182	240	157	338	181	418	145	141	162
8	145	149	140	164	230	180	353	182	417	144	142	789
9	144	166	141	134	220	415	337	197	417	143	141	2640
10	145	161	140	125	260	1020	334	189	417	144	139	2670
11	148	156	141	126	290	1450	333	184	421	144	140	2240
12	151	176	139	124	290	1740	383	184	661	145	140	1950
13	149	158	139	123	280	1910	440	184	776	144	140	1350
14	148	156	139	120	290	2250	441	184	529	143	204	530
15	150	164	128	117	430	2430	382	183	308	146	197	336
16	151	182	114	116	530	2190	337	182	272	145	154	322
17	153	187	118	121	520	1790	307	181	233	143	146	313
18	190	148	120	123	520	1260	189	184	233	162	142	310
19	190	156	123	125	510	979	184	179	235	166	152	305
20	179	150	121	127	490	975	184	175	179	152	151	264
21	156	148	117	128	480	883	184	171	172	148	146	223
22	164	153	120	130	470	680	209	170	170	157	152	226
23	189	159	118	132	400	798	524	167	168	168	301	232
24	156	154	121	129	340	904	258	181	167	158	169	234
25	155	154	119	128	340	893	217	406	167	154	161	190
26	157	174	126	129	340	793	209	195	163	152	194	145
27	153	159	131	131	280	707	204	169	178	148	178	145
28	155	153	121	138	178	751	196	165	229	145	169	148
29	154	153	121	210	---	868	189	163	157	148	160	147
30	152	149	123	484	---	861	183	159	150	151	149	134
31	153	---	122	781	---	779	---	160	---	148	177	---
TOTAL	4846	4880	4041	5207	10652	29036	10448	5835	9253	4633	5022	17009
MEAN	156	163	130	168	380	937	348	188	308	149	162	567
MAX	190	284	145	781	809	2430	667	406	776	168	301	2670
MIN	144	148	114	116	178	133	183	159	150	143	139	134
AC-FT	9610	9680	8020	10330	21130	57590	20720	11570	18350	9190	9960	33740

CAL YR 1988 TOTAL 250256 MEAN 684 MAX 3630 MIN 114 AC-FT 496400
WTR YR 1989 TOTAL 110862 MEAN 304 MAX 2670 MIN 114 AC-FT 219900

05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IA

LOCATION.--Lat 41°39'05", long 91°30'27", in SW1/4 NE1/4 sec.14, T.79 N., R.6 W., Johnson County, Hydrologic Unit 07080209, on right bank 60 ft downstream from bridge on Muscatine Avenue in Iowa City, and 1.2 mi upstream from mouth.

DRAINAGE AREA.--2.94 mi^2.

PERIOD OF RECORD.--October 1963 to current year.

REVISED RECORDS.--WDR IOWA 1966: Drainage area.

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 678.03 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 29 to Dec. 2, Dec. 10 to Jan. 8, Jan. 11, 12, Feb. 4 to Mar. 11, Mar. 18, May 27, 29, 30, and June 5-8. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--26 years, 2.36 ft^3/s, 10.90 in/yr, 1,710 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,070 ft^3/s July 17, 1972, gage height, 9.47 ft; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 14, 1962, reached a stage of 10.5 ft, from flood profile, discharge not determined.

EXTREMES FOR CURRENT YEAR.-- Peak discharges greater than base discharge of 200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Aug. 3	2030	*340	*6.10	Sept. 9	0310	223	4.89

No flow many days during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.15	.02	.00	.62	.04	.21	4.8	2.2	.00	.00	3.4
2	.00	.18	.03	.00	.40	.06	.17	1.4	.49	.00	.00	.35
3	.00	.13	.06	.00	.14	.60	.15	1.1	3.0	.00	14	.16
4	.00	.55	.04	.00	.03	2.4	.13	1.8	.82	.00	2.4	.23
5	.03	.07	.04	.20	.03	.60	.11	.84	.35	.00	.10	.10
6	.01	.04	.05	.50	.02	.28	.09	.64	.25	.00	.01	.07
7	.0	.14	.04	1.0	.01	.90	.53	.59	.17	.00	.00	1.4
8	.00	.10	.03	.20	.02	2.0	1.7	.46	.13	.00	.00	3.8
9	.27	2.0	.02	.12	.03	6.0	.17	1.4	.10	.00	.00	24
10	.02	.28	.02	.10	.02	1.5	.13	.40	.08	.00	.00	1.5
11	.0	.10	.02	.09	.02	.70	.13	.34	.88	.00	.00	.89
12	.0	4.3	.02	.30	.03	.55	.18	.33	4.6	.00	.00	.76
13	.00	.29	.01	.11	.10	.37	.14	.33	.88	.00	.00	1.1
14	.00	.11	.01	.12	.08	.37	.12	.32	.56	.00	6.0	.61
15	.00	1.3	.01	.30	.05	.25	.09	.28	.20	.00	1.0	.50
16	.00	.67	.01	.13	.04	.19	.24	.26	.13	.00	.07	.42
17	.32	.37	.01	.10	.03	.42	.20	.27	.12	.00	.0	.34
18	.04	.58	.00	.12	.03	.17	.52	.76	.10	5.3	.00	.30
19	.01	.70	.00	.17	.04	.15	.14	.22	.10	.37	1.3	.27
20	.15	.35	.00	.11	.03	.17	.10	.18	.46	.02	.09	.24
21	.44	.15	.00	.07	.02	.12	.07	.13	.08	.09	.0	.21
22	.74	.05	.00	.09	.02	.11	6.7	.12	.03	.40	.0	.21
23	2.8	.03	.00	.08	.02	.15	19	.10	.00	1.4	4.3	.18
24	.23	.05	.00	.08	.03	.18	1.4	3.8	.00	.12	.36	.17
25	.19	.05	.00	.15	.04	.21	.74	2.1	.00	.0	.11	.17
26	.19	1.3	.00	.10	.03	.23	2.6	.54	.53	.00	2.1	.14
27	.18	.12	.02	.07	.02	.28	1.2	.14	.37	.00	.28	.11
28	.18	.08	.03	6.2	.03	1.9	1.3	.90	.03	.00	.14	.10
29	.19	.05	.01	4.8	---	.32	.85	.40	.00	.00	.34	.09
30	.18	.03	.00	.54	---	.22	.67	.20	.00	.00	.05	.05
31	.17	---	.00	.46	---	.20	---	.87	---	.00	2.8	---
TOTAL	6.34	14.32	0.50	16.31	1.98	21.64	39.78	26.02	16.66	7.70	35.45	41.87
MEAN	.20	.48	.016	.53	.071	.70	1.33	.84	.56	.25	1.14	1.40
MAX	2.8	4.3	.06	6.2	.62	6.0	19	4.8	4.6	5.3	14	24
MIN	.00	.03	.00	.00	.01	.04	.07	.10	.00	.00	.00	.05
AC-FT	13	28	1.0	32	3.9	43	79	52	33	15	70	83
CFSM	.07	.16	.01	.18	.02	.24	.45	.29	.19	.08	.39	.47
IN.	.08	.18	.01	.21	.03	.27	.50	.33	.21	.10	.45	.53

CAL YR 1988 TOTAL 349.84 MEAN .96 MAX 42 MIN .00 AC-FT 694 CFSM .33 IN. 4.43
WTR YR 1989 TOTAL 228.57 MEAN .63 MAX 24 MIN .00 AC-FT 453 CFSM .21 IN. 2.89

05455100 OLD MANS CREEK NEAR IOWA CITY, IA

LOCATION.--Lat. 41°36'23", long. 91°36'56", in SE1/4 SW1/4 NW1/4 sec. 36, T.79 N., R.7 W., Johnson County, Hydrologic Unit 07080209, on left bank 10 ft downstream from bridge on county highway W62, 5 miles southwest of Iowa City, 5.9 miles upstream of Dirty Face Creek, and 8.6 miles upstream from mouth.

DRAINAGE AREA.--201 mi^2.

PERIOD OF RECORD.--October 1950 to September 1964, published in WSP 1914. Annual maximum, water years 1965-84. Occasional low-flow measurements, water years 1964-77, October 1984 to current year.

GAGE.--Water-stage recorder. Datum of gage is 637.49 ft above NGVD. Prior to Nov. 16, 1984, nonrecording gage at same site at datum 2.00 ft higher. Prior to Oct. 1, 1987, at datum 2.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 1, 2, Dec. 8 to Jan. 29, and Feb. 2 to Mar. 10. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

COOPERATION.--Gage height record and discharge measurements for water years 1951-64 were collected by the U.S. Army Corps of Engineers and computed by the U.S. Geological Survey.

AVERAGE DISCHARGE.--19 years (1951-64, 1985-89), 98.5 ft^3/s, 6.66 in/yr, 71,360 acre-ft/yr; median of yearly mean discharges, 95 ft^3/s, 6.4 in/yr, 68,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft^3/s May 29, 1962, gage height, 16.52 ft, present datum; minimum daily discharge, 0.1 ft^3/s for several days in 1957, 1958 and 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 13,500 ft^3/s, on the basis of contracted-opening of peak flow, June 15, 1982, gage height, 17.25 ft, present datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	0615	*1620	*11.50				

Minimum discharge, 1.2 ft^3/s Oct. 5-10, 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	1.9	2.5	2.1	40	2.3	2.6	7.5	524	2.9	2.3	15
2	1.3	2.1	2.6	2.0	20	2.4	2.5	10	113	2.8	2.3	36
3	1.3	2.4	2.6	1.9	10	5.0	2.5	9.3	330	2.7	2.5	12
4	1.3	2.2	2.6	1.9	6.0	300	2.5	7.4	156	2.7	2.7	4.0
5	1.2	2.2	2.6	3.0	4.5	100	2.4	6.0	49	2.5	2.2	3.0
6	1.2	2.1	2.6	25	4.0	65	2.3	5.0	31	2.3	2.2	2.9
7	1.2	2.2	2.5	9.0	3.5	50	2.2	4.4	20	2.3	2.2	4.5
8	1.2	2.2	2.1	6.4	3.0	60	2.5	3.9	13	2.3	2.2	823
9	1.2	3.4	2.0	5.0	2.5	150	3.1	12	9.4	2.3	2.2	1310
10	1.2	2.3	1.9	5.2	2.3	300	3.6	6.1	11	2.4	2.2	519
11	1.3	2.1	2.0	4.7	2.4	158	3.0	3.7	6.6	2.3	2.2	174
12	1.2	2.4	2.2	4.3	2.5	71	2.7	3.3	38	2.1	2.4	93
13	1.3	2.5	2.4	4.0	2.6	27	2.6	3.1	23	2.1	2.2	61
14	1.4	2.4	2.2	3.8	2.5	18	2.4	2.9	13	2.3	2.5	48
15	1.4	2.7	2.0	4.0	2.6	11	2.4	2.9	7.9	2.2	2.5	38
16	1.5	93	2.1	3.7	2.4	8.1	2.3	2.7	5.7	2.1	2.6	31
17	1.4	64	2.2	4.0	2.3	7.2	2.4	2.7	4.4	2.0	2.6	24
18	1.4	13	2.5	4.3	2.3	5.7	2.4	2.7	4.0	2.1	2.7	19
19	1.5	4.8	2.4	4.1	2.4	5.6	2.4	2.7	3.6	26	2.6	15
20	1.7	3.3	2.3	4.4	2.4	4.1	2.4	2.6	3.4	27	2.7	11
21	1.9	3.0	2.2	4.7	2.5	4.1	2.5	2.6	3.2	4.8	5.1	7.5
22	1.8	2.9	2.2	4.6	2.4	3.7	2.5	3.1	3.0	2.7	3.2	6.1
23	2.3	2.8	2.1	4.3	2.2	3.8	90	2.8	2.9	2.4	2.9	4.6
24	2.5	2.8	2.0	4.4	2.2	3.5	32	12	2.8	2.6	2.9	4.6
25	3.9	2.7	2.1	4.2	2.3	3.4	15	632	2.8	2.8	2.9	4.1
26	2.3	3.1	2.2	4.2	2.5	3.2	8.0	101	2.8	2.6	3.1	4.0
27	1.9	3.4	2.5	4.6	2.4	3.3	5.4	22	51	2.3	7.3	4.1
28	1.9	3.6	2.4	4.4	2.4	3.8	5.9	7.9	30	2.2	9.7	4.1
29	1.9	3.0	2.2	40	---	3.8	7.0	6.7	7.8	2.1	3.8	4.1
30	1.9	2.7	2.3	212	---	3.5	6.1	4.5	3.4	2.1	3.3	3.8
31	2.0	---	2.2	74	---	2.9	---	3.4	---	2.2	3.3	---
TOTAL	50.8	243.2	70.7	464.2	139.1	1389.4	225.6	898.9	1475.7	124.2	95.5	3290.4
MEAN	1.64	8.11	2.28	15.0	4.97	44.8	7.52	29.0	49.2	4.01	3.08	110
MAX	3.9	93	2.6	212	40	300	90	632	524	27	9.7	1310
MIN	1.2	1.9	1.9	1.9	2.2	2.3	2.2	2.6	2.8	2.0	2.2	2.9
AC-FT	101	482	140	921	276	2760	447	1780	2930	246	189	6530
CFSM	.01	.04	.01	.07	.02	.22	.04	.14	.24	.02	.02	.55
IN.	.01	.05	.01	.09	.03	.26	.04	.17	.27	.02	.02	.61

CAL YR 1988 TOTAL 14644.3 MEAN 40.0 MAX 1100 MIN 1.2 AC-FT 29050 CFSM .20 IN. 2.71
WTR YR 1989 TOTAL 8467.7 MEAN 23.2 MAX 1310 MIN 1.2 AC-FT 16800 CFSM .12 IN. 1.57

05455500 ENGLISH RIVER AT KALONA, IA

LOCATION.--Lat 41°27'59", long 91°42'56", in SE1/4 SE1/4 sec.13, T.77 N., R.8 W., Washington County, Hydrologic Unit 07080209, on right bank 30 ft upstream from bridge on State Highway 1, 0.8 mi south of Kalona, 1.1 mi upstream from Camp Creek, 4.5 mi downstream from Smith Creek, and 14.5 mi upstream from mouth.

DRAINAGE AREA.--573 mi^2.

PERIOD OF RECORD.--September 1939 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1940 (M), 1941. WSP 1708: 1956, 1957 (P), 1958 (P).

GAGE.--Water-stage recorder. Datum of gage is 633.45 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Dec. 27, 1939, nonrecording gage 30 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 13 to Mar. 20. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--50 years, 366 ft^3/s, 8.67 in/yr, 265,200 acre-ft/yr; median of yearly mean discharges, 330 ft^3/s, 7.8 in/yr, 239,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft^3/s Sept. 21, 1965, gage height, 21.45 ft; minimum daily discharge, 0.66 ft^3/s Feb. 5-7, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1930 reached a stage of 19.9 ft, from floodmark, from information by local residents, discharge, 18,500 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	1615	*4,090	*15.03	No other peak greater than base discharge.			

Minimum discharge, 3.0 ft^3/s Oct. 12 and Dec. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	5.1	16	12	130	17	33	49	1350	22	7.5	57
2	12	5.8	16	11	80	18	29	43	681	17	7.0	117
3	9.9	5.4	7.9	10	60	19	27	41	470	13	8.1	89
4	7.0	7.3	11	10	70	70	26	37	585	11	21	54
5	5.7	14	10	15	20	350	24	32	203	9.6	11	30
6	5.0	8.9	7.5	25	15	300	22	27	109	8.5	8.2	21
7	4.6	8.9	5.1	60	12	170	21	23	74	8.0	8.5	21
8	4.7	11	13	25	11	150	26	20	54	7.7	12	2160
9	6.1	13	8.8	20	10	200	30	18	44	7.2	11	3850
10	4.9	18	10	19	9.8	600	40	16	37	6.8	7.7	3790
11	4.3	18	13	23	9.6	350	37	14	32	6.5	6.5	2200
12	3.6	22	17	21	9.6	230	30	13	54	12	5.9	708
13	3.5	24	15	21	10	130	25	12	65	13	5.5	543
14	3.9	23	12	20	11	80	22	11	55	9.8	6.0	398
15	3.6	22	11	25	12	50	20	10	38	20	6.9	309
16	3.5	25	12	24	13	60	19	9.6	29	11	7.2	246
17	5.0	241	11	25	14	56	18	9.1	24	8.6	7.1	202
18	5.0	98	10	27	13	52	18	8.9	21	9.6	5.7	168
19	6.8	53	12	26	12	48	18	9.1	19	43	5.6	143
20	9.1	29	16	25	12	43	17	11	18	135	6.4	119
21	8.6	17	10	25	13	40	16	13	16	101	10	103
22	7.2	13	11	30	13	37	15	25	14	48	10	95
23	8.8	8.0	13	31	13	35	21	19	13	40	12	86
24	9.8	6.9	10	27	14	33	19	16	11	28	20	79
25	10	6.6	9.0	35	15	32	17	455	10	23	20	75
26	18	10	11	32	15	32	17	312	13	21	17	67
27	12	11	13	30	16	33	21	110	47	15	27	65
28	8.4	15	11	34	17	37	49	57	85	11	20	63
29	6.2	10	11	70	---	41	65	53	65	9.3	19	60
30	6.0	9.7	10	350	---	43	48	173	37	8.8	22	56
31	5.8	---	11	210	---	39	---	133	---	8.0	24	---
TOTAL	221.0	759.6	354.3	1318	650.0	3395	790	1779.7	4273	692.4	365.8	15974
MEAN	7.13	25.3	11.4	42.5	23.2	110	26.3	57.4	142	22.3	11.8	532
MAX	18	241	17	350	130	600	65	455	1350	135	27	3850
MIN	3.5	5.1	5.1	10	9.6	17	15	8.9	10	6.5	5.5	21
AC-FT	438	1510	703	2610	1290	6730	1570	3530	8480	1370	726	31680
CFSM	.01	.04	.02	.07	.04	.19	.05	.10	.25	.04	.02	.93
IN.	.01	.05	.02	.09	.04	.22	.05	.12	.28	.04	.02	1.04

CAL YR 1988 TOTAL 36480.5 MEAN 99.7 MAX 1250 MIN 1.8 AC-FT 72360 CFSM .17 IN. 2.37
WTR YR 1989 TOTAL 30572.8 MEAN 83.8 MAX 3850 MIN 3.5 AC-FT 60640 CFSM .15 IN. 1.98

05455700 IOWA RIVER NEAR LONE TREE, IA

LOCATION.--Lat 41°25'15", long 91°28'25", in NW1/4 NE1/4 sec.6, T.76 N., R.5 W., Louisa County, Hydrologic Unit 07080209, on left bank 2,000 ft downstream from tri-county bridge on county highway W66, 5 mi southwest of Lone Tree, 6.2 mi downstream from English River, and at mile 47.2.

DRAINAGE AREA.--4,293 mi^2.

PERIOD OF RECORD.--October 1956 to current year.

GAGE.--Water-stage recorder. Datum of gage is 588.16 ft above NGVD. Prior to Dec. 28, 1956, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 9 to Jan. 23, Feb. 4 to Mar. 13, May 25, and June 3. Records good except those for estimated daily discharges, which are poor. Flow regulated by Coralville Lake (station 05453510), 36.1 mi upstream, since Sept. 17, 1958. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers gage height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--33 years, 2,792 ft^3/s, 8.83 in/yr, 2,023,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,700 ft^3/s May 19, 1974, gage height, 18.97 ft; maximum gage height, 20.27 ft Sept. 22, 1965; minimum daily discharge, 69 ft^3/s Aug. 4, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 25, 1944, reached a stage of 19.94 ft, discharge not determined, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,930 ft^3/s Sept. 10, gage height, 11.89 ft; Minimum daily discharge, 142 ft^3/s, Aug. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	202	181	191	155	1850	230	924	325	1390	229	159	276
2	204	177	186	155	1570	190	805	375	2460	205	156	325
3	198	187	184	150	740	250	750	387	1060	196	156	291
4	197	225	176	155	600	700	734	335	1680	188	342	247
5	197	330	174	165	450	1200	725	327	1130	174	276	210
6	194	213	182	220	340	740	718	303	746	172	176	200
7	195	196	179	375	310	560	570	286	608	168	158	198
8	198	202	171	300	290	450	511	271	585	167	153	978
9	197	204	170	230	280	500	534	269	552	163	154	7350
10	193	247	165	200	280	700	526	275	525	161	148	8580
11	195	222	155	170	310	1000	526	270	504	161	146	7620
12	190	225	170	165	350	1300	531	255	546	162	143	4760
13	186	264	180	160	360	1800	548	247	824	164	142	3300
14	191	217	185	170	400	2370	561	242	812	169	144	2000
15	191	209	180	180	500	2690	567	235	584	166	227	1150
16	189	233	165	180	540	2670	495	232	440	175	231	883
17	190	302	160	190	560	2230	459	228	400	167	165	776
18	188	368	170	185	560	1810	405	226	345	204	151	709
19	153	267	180	185	560	1230	299	226	335	290	144	663
20	150	233	180	190	540	1140	275	225	335	250	164	633
21	172	213	170	185	540	1120	272	214	292	307	154	566
22	187	201	160	185	530	939	276	210	249	271	152	502
23	255	205	160	180	500	818	994	210	232	248	187	470
24	243	204	160	171	450	983	872	221	222	260	342	443
25	191	195	160	165	430	1020	440	937	213	213	202	430
26	189	226	150	163	410	1010	351	1400	215	185	187	369
27	182	234	150	158	350	892	329	632	242	183	240	300
28	186	206	150	162	280	836	330	412	287	183	217	285
29	180	202	145	238	---	882	327	352	364	183	190	280
30	179	200	155	439	---	960	327	326	268	181	173	268
31	178	---	160	1290	---	979	---	333	---	166	186	---
TOTAL	5940	6788	5223	7216	14880	34199	15981	10786	18445	6111	5765	45062
MEAN	192	226	168	233	531	1103	533	348	615	197	186	1502
MAX	255	368	191	1290	1850	2690	994	1400	2460	307	342	8580
MIN	150	177	145	150	280	190	272	210	213	161	142	198
AC-FT	11780	13460	10360	14310	29510	67830	31700	21390	36590	12120	11430	89380

CAL YR 1988 TOTAL 353413 MEAN 966 MAX 6000 MIN 145 AC-FT 701000
WTR YR 1989 TOTAL 176396 MEAN 483 MAX 8580 MIN 142 AC-FT 349900

05457700 CEDAR RIVER AT CHARLES CITY, IA

LOCATION.--Lat 43°03'45", long 92°40'23", in SE1/4 NE1/4, sec.12, T.95 N., R.16 W., Floyd County, Hydrologic Unit 07080201, on right bank 800 ft downstream from bridge on U.S. Highway 18 (Brantingham Street) in Charles City, 10.6 mi upstream from Gizzard Creek, and at mile 252.9 upstream from mouth of Iowa River.

DRAINAGE AREA.--1,054 mi^2.

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 973.02 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 19, 20, Dec. 13-17, 28, 29, Jan. 2, 8-10, 23-27, Feb. 1-9, 14, 15, 19, 20, 22-25, Mar. 3-17, 25, 26, Aug. 30 to Sept. 4. Records good except those for estimated daily discharges, which are poor. Occasional minor regulation by dam 0.2 mi upstream from gage. Daily wire-weight gage readings available in district office for period Sept. 13, 1945 to June 30, 1954, at same site and datum. Discharge not published for this period because of extreme regulation of streamflow by power dam 0.2 mi upstream. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector telemeter at station.

AVERAGE DISCHARGE.--25 years, 694 ft^3/s, 8.94 in/yr, 502,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,000 ft^3/s Apr. 7, 1965, gage height, 19.14 ft; maximum gage height, 21.64 ft Mar. 2, 1965, backwater from ice; minimum daily discharge, 60 ft^3/s Nov. 23, 1977, Jan. 7, 1978.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 27, 1961, reached a stage of 21.6 ft, from floodmarks, discharge, 29,200 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 13	0830	Ice jam	*8.46	Mar. 15	----	*2,300	Ice jam

Minimum discharge, 86 ft^3/s Aug. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	165	130	192	140	160	124	575	829	204	190	148	387
2	159	131	181	135	140	131	485	669	274	179	134	329
3	149	133	201	125	120	130	441	567	247	168	129	361
4	139	140	209	138	100	140	457	506	212	155	125	465
5	136	154	194	118	120	145	729	472	194	153	118	563
6	136	154	196	120	160	140	712	435	179	144	113	524
7	136	153	189	135	240	135	521	418	171	130	131	465
8	136	149	150	125	230	135	430	390	165	124	117	413
9	136	146	147	120	220	130	375	379	160	120	106	376
10	136	142	133	125	233	130	338	364	154	116	101	352
11	131	136	133	123	209	130	301	351	146	116	98	347
12	132	150	129	135	176	250	280	334	144	120	98	318
13	132	153	130	116	155	450	264	317	149	150	95	281
14	131	149	135	116	145	600	252	305	153	166	103	257
15	129	185	135	113	135	2100	246	301	144	153	103	238
16	132	215	130	113	152	1900	241	288	144	138	101	221
17	137	290	130	113	133	1700	236	271	137	128	98	208
18	137	347	140	113	128	1180	230	264	133	137	95	193
19	133	300	143	114	125	701	224	258	130	164	96	181
20	136	280	171	119	120	510	218	249	125	249	93	172
21	140	206	168	123	130	428	214	238	120	303	90	167
22	136	211	187	125	125	370	225	228	116	319	89	165
23	141	238	190	120	115	405	244	219	116	271	104	162
24	140	232	190	115	110	660	278	217	116	220	98	147
25	132	224	167	125	110	900	288	210	122	174	94	143
26	127	228	164	130	140	1700	312	209	137	156	99	139
27	135	224	171	140	134	1560	449	209	161	145	103	137
28	132	153	170	140	124	1400	574	199	187	134	112	140
29	131	149	155	144	---	1210	612	192	195	130	164	140
30	132	184	128	157	---	953	840	188	199	126	173	138
31	134	---	139	175	---	724	---	186	---	137	236	---
TOTAL	4238	5686	4997	3950	4189	21171	11591	10262	4834	5115	3564	8129
MEAN	137	190	161	127	150	683	386	331	161	165	115	271
MAX	165	347	209	175	240	2100	840	829	274	319	236	563
MIN	127	130	128	113	100	124	214	186	116	116	89	137
AC-FT	8410	11280	9910	7830	8310	41990	22990	20350	9590	10150	7070	16120
CFSM	.13	.18	.15	.12	.14	.65	.37	.31	.15	.16	.11	.26
IN.	.15	.20	.18	.14	.15	.75	.41	.36	.17	.18	.13	.29

CAL YR 1988 TOTAL 103059 MEAN 282 MAX 1340 MIN 81 AC-FT 204400 CFSM .27 IN. 3.64
WTR YR 1989 TOTAL 87726 MEAN 240 MAX 2100 MIN 89 AC-FT 174000 CFSM .23 IN. 3.10

05458000 LITTLE CEDAR RIVER NEAR IONIA, IA

LOCATION.--Lat 43°02'05", long 92°30'05", in SW1/4 NE1/4 sec.21, T.95 N., R.14 W., Chickasaw County, Hydrologic Unit 07080201, on left bank 12 ft downstream from bridge on county highway B57, 2.4 mi west of Ionia, 6.4 mi upstream from mouth, and 7.6 mi downstream from Beaver Creek.

DRAINAGE AREA.--306 mi^2.

PERIOD OF RECORD.--October 1954 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1959.

GAGE.--Water-stage recorder. Datum of gage is 973.35 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 11, Feb. 2-13, and Mar. 4-23. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--35 years, 172 ft^3/s, 7.63 in/yr, 124,600 acre-ft/yr; median of yearly mean discharges, 150 ft^3/s, 6.7 in/yr, 109,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft^3/s Mar. 27, 1961, gage height, 15.58 ft; minimum daily discharge, 3.0 ft^3/s Feb. 4-9, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 22, 1954, reached a stage of 11.37 ft, discharge, 4,600 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discherge of 1,200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	1200	*650	(a)*6.67				

(a) Ice jam

Minimum discharge, 4.9 ft^3/s Aug. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	11	18	15	30	19	91	100	31	19	11	18
2	15	11	21	14	20	19	82	90	29	17	11	16
3	14	11	23	14	14	18	76	81	28	16	10	21
4	13	11	20	13	9.0	16	71	78	25	14	9.5	32
5	12	12	21	13	9.7	13	73	75	23	13	10	45
6	12	12	20	13	11	14	90	70	22	12	8.8	40
7	12	12	20	13	12	15	77	66	22	11	8.2	35
8	11	13	18	13	17	16	70	63	21	10	7.6	31
9	11	13	18	12	14	17	63	63	20	9.6	7.2	28
10	11	13	17	12	15	45	59	60	19	8.8	6.8	29
11	11	13	17	11	19	250	56	58	18	11	6.2	30
12	11	15	15	11	22	580	53	56	20	10	6.0	28
13	11	16	14	10	23	520	51	54	18	9.5	6.0	25
14	11	16	15	10	24	480	49	52	17	11	6.2	22
15	11	18	14	10	23	450	47	50	17	13	6.7	20
16	10	25	12	11	22	300	46	48	16	13	6.6	18
17	10	26	12	11	22	140	45	45	15	12	6.4	16
18	11	30	12	11	22	70	43	44	15	18	5.9	15
19	11	32	13	11	22	66	42	45	14	26	6.2	13
20	11	27	15	12	22	61	41	43	13	40	6.2	11
21	11	18	14	12	21	66	41	41	12	31	5.7	9.6
22	11	18	15	12	21	68	43	39	12	26	5.7	9.7
23	11	30	16	13	21	83	49	37	12	23	5.6	8.9
24	11	30	18	13	20	151	66	36	11	21	6.0	8.8
25	11	28	19	14	20	278	70	35	13	19	5.9	8.7
26	11	28	20	14	20	293	72	41	17	17	5.9	8.3
27	11	26	20	14	19	210	75	38	17	16	5.8	7.8
28	11	13	18	15	20	184	84	34	17	14	6.1	7.5
29	11	15	17	16	---	151	95	33	18	13	5.6	7.2
30	10	17	16	18	---	123	105	36	19	13	5.3	6.9
31	11	---	15	25	---	104	---	33	---	12	14	---
TOTAL	356	560	523	406	534.7	4820	1925	1644	551	498.9	224.1	576.4
MEAN	11.5	18.7	16.9	13.1	19.1	155	64.2	53.0	18.4	16.1	7.23	19.2
MAX	17	32	23	25	30	580	105	100	31	40	14	45
MIN	10	11	12	10	9.0	13	41	33	11	8.8	5.3	6.9
AC-FT	706	1110	1040	805	1060	9560	3820	3260	1090	990	445	1140
CFSM	.04	.06	.06	.04	.06	.51	.21	.17	.06	.05	.02	.06
IN.	.04	.07	.06	.05	.07	.59	.23	.20	.07	.06	.03	.07

CAL YR 1988 TOTAL 15241.2 MEAN 41.6 MAX 370 MIN 6.1 AC-FT 30230 CFSM .14 IN. 1.85
WTR YR 1989 TOTAL 12619.1 MEAN 34.6 MAX 580 MIN 5.3 AC-FT 25030 CFSM .11 IN. 1.53

05458500 CEDAR RIVER AT JANESVILLE, IA

LOCATION.--Lat 42°38'54", long 92°27'54", in NE1/4 SW1/4 sec.35, T.91 N., R.14 W., Bremer County, Hydrologic Unit 07080201, on left bank 300 ft downstream from bridge on county highway at Janesville, 3.6 mi upstream from West Fork Cedar River, and at mile 207.7 upstream from mouth of Iowa River.

DRAINAGE AREA.--1,661 mi^2.

PERIOD OF RECORD.--October 1904 to Sept. 1906, October 1914 to September 1927, October 1932 to September 1942, October 1945 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as Red Cedar River at Janesville, 1905-06.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1906 (M), 1915-16 (M), 1917, 1918-19 (M), 1920-27, 1933-37 (M), 1940-42 (M).

GAGE.--Water-stage recorder. Datum of gage is 868.26 ft above NGVD. Prior to July 26, 1919, nonrecording gage at site 1,000 ft downstream at datum 4.0 ft lower. July 26, 1919, to Sept. 30, 1927, Nov. 14, 1932, to Sept 30, 1942, and Apr. 26, 1946, to Nov. 10, 1949, nonrecording gage at county bridge 300 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 19-21, Dec. 11-24, 26, 27, 29-31, Jan. 3-7, 9-18, 23-25, Feb. 2-28, and March 1-17. Records good except those for estimated daily discharges, which are poor. Diurnal fluctuation during low water caused by powerplant at Waverly, 10 mi upstream. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--69 years (water years 1905-06, 1915-27, 1933-42, 1946-89), 856 ft^3/s, 7.00 in/yr, 620,200 acre-ft/yr; median of yearly mean discharges, 750 ft^3/s, 6.1 in/yr, 543,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,000 ft^3/s Mar. 28, 1961, gage height, 16.33 ft; minimum daily discharge, 28 ft^3/s Oct. 21, 1922.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 17, 1945, reached a stage of 16.2 ft, from floodmark at site 300 ft upstream, discharge, 34,300 ft^3/s. Flood of Mar. 16, 1929, reached a stage of about 16 ft, from information by City of Waterloo, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 14	1945	Ice jam	*7.89	Mar. 27	0830	*4,170	4.71

Minimum discharge, 109 ft^3/s Aug. 28-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	226	161	215	196	370	220	1040	813	249	222	160	294
2	218	161	331	183	180	215	865	888	249	224	152	264
3	208	164	448	190	140	235	731	770	300	223	154	350
4	203	169	362	170	110	250	655	669	319	181	149	893
5	190	176	288	180	140	270	672	553	265	187	143	896
6	295	173	253	170	220	270	1080	501	248	168	142	645
7	197	173	245	160	310	275	979	500	244	169	138	555
8	191	175	275	146	270	280	799	475	244	162	135	717
9	192	177	447	130	240	300	665	464	234	158	136	494
10	178	166	360	140	245	620	568	415	223	158	133	413
11	200	174	300	135	250	960	528	434	213	159	129	372
12	172	186	270	135	260	1150	484	403	233	164	126	352
13	180	185	230	130	265	1920	426	385	222	160	126	338
14	179	187	205	125	245	3150	421	378	216	182	125	311
15	180	190	190	150	230	3700	395	371	217	179	123	280
16	182	232	185	160	215	3180	364	360	203	180	122	260
17	196	244	180	170	200	2900	358	349	187	174	122	243
18	184	252	175	180	210	2410	340	354	195	175	121	226
19	188	300	180	213	200	1760	323	392	201	217	121	213
20	183	280	200	233	180	1320	316	379	184	206	127	203
21	180	290	180	201	165	976	312	334	178	270	123	191
22	182	273	190	229	180	895	309	315	179	344	119	192
23	174	253	200	205	150	846	336	308	179	330	125	173
24	175	284	210	210	165	901	334	315	166	284	124	156
25	175	278	199	220	220	1030	349	297	174	252	116	168
26	174	294	190	235	240	2380	368	283	209	226	115	149
27	247	284	180	233	220	3980	397	275	204	204	116	148
28	179	231	177	236	240	3060	469	275	207	182	113	151
29	145	202	160	252	---	2080	595	273	217	173	112	144
30	141	175	175	293	---	1660	633	281	227	163	112	135
31	154	---	190	335	---	1310	---	288	---	161	204	---
TOTAL	5868	6489	7390	5945	6060	44503	16111	13097	6586	6237	4063	9926
MEAN	189	216	238	192	216	1436	537	422	220	201	131	331
MAX	295	300	448	335	370	3980	1080	888	319	344	204	896
MIN	141	161	160	125	110	215	309	273	166	158	112	135
AC-FT	11640	12870	14660	11790	12020	88270	31960	25980	13060	12370	8060	19690
CFSM	.11	.13	.14	.12	.13	.86	.32	.25	.13	.12	.08	.20
IN.	.13	.15	.17	.13	.14	1.00	.36	.29	.15	.14	.09	.22

CAL YR 1988 TOTAL 152813 MEAN 418 MAX 2600 MIN 126 AC-FT 303100 CFSM .25 IN. 3.42
WTR YR 1989 TOTAL 132275 MEAN 362 MAX 3980 MIN 110 AC-FT 262400 CFSM .22 IN. 2.96

05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IA

LOCATION.--Lat 42°37'50", long 92°32'24", in SW1/4 SE1/4 sec.6, T.90 N., R.14 W., Black Hawk County, Hydrologic Unit 07080204, on left bank 100 ft downstream from bridge on county highway C55 at Finchford, 3.2 mi upstream upstream from Shell Rock River, and 5.0 mi upstream from mouth.

DRAINAGE AREA.--846 mi^2.

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1955, published as West Fork Shell Rock River at Finchford.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946 (M), 1947.

GAGE.--Water-stage recorder. Datum of gage is 867.54 ft above NGVD. Prior to June 10, 1955, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Oct. 6-13, Nov. 19-22, and Nov. 28 to Mar. 25. Records good except those estimated daily discharges, which are poor. An authorized diversion of 2,100 acre-ft is made into Big Marsh, 16 mi upstream from gage, each year between September 1 and November 15. Net effect on daily flows at gage is unknown. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--44 years, 499 ft^3/s, 8.01 in/yr, 361,500 acre-ft/yr; median of yearly mean discharges, 410 ft^3/s, 6.6 in/yr, 297,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,900 ft^3/s June 27, 1951, gage height, 17.28 ft, from floodmarks; minimum daily discharge, 5.9 ft^3/s Feb. 26, 27, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1929 reached a stage of about 14 ft, from information by local resident, discharge, about 12,800 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 14	1745	*1,250	(a) *9.55				

(a) Ice jam

Minimum daily discharge, 12 ft^3/s Sept. 26-28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	23	69	49	67	50	244	207	102	62	20	15
2	24	23	68	48	45	52	225	190	100	55	20	13
3	24	23	78	47	35	56	211	178	92	51	19	13
4	23	23	72	46	40	53	201	169	85	48	19	15
5	21	25	68	47	45	51	190	160	79	45	18	14
6	21	26	70	54	48	50	181	154	75	42	17	13
7	22	27	65	56	50	52	174	145	72	39	17	14
8	23	27	54	63	56	54	173	138	74	37	16	31
9	21	27	52	66	50	70	172	136	72	35	16	31
10	29	27	64	60	57	360	169	133	70	33	15	28
11	26	26	66	57	56	495	162	129	70	33	15	26
12	24	32	65	52	55	600	157	125	69	34	15	23
13	24	31	64	48	56	720	151	120	66	32	14	21
14	26	32	61	46	54	1130	145	116	65	32	15	19
15	27	39	58	43	54	910	139	112	61	31	14	17
16	21	52	57	40	52	690	136	108	58	30	13	17
17	22	61	58	40	50	660	133	106	55	29	13	20
18	22	68	58	39	52	480	129	105	52	30	13	17
19	20	70	58	38	54	370	126	105	50	31	14	15
20	22	72	59	39	54	370	124	101	47	30	17	14
21	23	70	56	44	52	350	122	97	45	31	14	13
22	22	68	54	43	50	330	121	92	43	31	13	14
23	22	84	55	43	50	330	122	87	44	32	15	14
24	22	89	56	45	52	330	122	86	43	30	14	13
25	24	97	54	47	54	310	124	88	47	29	13	13
26	23	97	53	50	53	329	122	107	52	27	14	12
27	23	90	56	52	52	322	122	109	57	27	14	12
28	23	87	54	54	50	324	130	95	66	24	13	12
29	23	86	53	58	---	319	173	86	70	22	13	14
30	22	78	53	60	---	297	212	85	69	23	13	13
31	24	---	51	64	---	268	---	91	---	22	14	---
TOTAL	714	1580	1859	1538	1443	10782	4712	3760	1950	1057	470	506
MEAN	23.0	52.7	60.0	49.6	51.5	348	157	121	65.0	34.1	15.2	16.9
MAX	29	97	78	66	67	1130	244	207	102	62	20	31
MIN	20	23	51	38	35	50	121	85	43	22	13	12
AC-FT	1420	3130	3690	3050	2860	21390	9350	7460	3870	2100	932	1000
CFSM	.03	.06	.07	.06	.06	.41	.19	.14	.08	.04	.02	.02
IN.	.03	.07	.08	.07	.06	.47	.21	.17	.09	.05	.02	.02

CAL YR 1988 TOTAL 59296 MEAN 162 MAX 1290 MIN 17 AC-FT 117600 CFSM .19 IN. 2.61
WTR YR 1989 TOTAL 30371 MEAN 83.2 MAX 1130 MIN 12 AC-FT 60240 CFSM .10 IN. 1.34

05459500 WINNEBAGO RIVER AT MASON CITY, IA

LOCATION.--Lat 43°09'54", long 93°11'33", in NE1/4 NW1/4 sec.3, T.96 N., R.20 W., Cerro Gordo County, Hydrologic Unit 07080203, on right bank 650 ft upstream from Thirteenth Street Bridge in Mason City, 0.1 mi downstream from Calmus Creek, and 1.0 mi upstream from Willow Creek, and at mile 275.8 upstream from mouth of Iowa River.

DRAINAGE AREA.--526 mi^2.

PERIOD OF RECORD.--October 1932 to current year. Prior to December 1932, monthly discharge only, published in WSP 1308. Prior to October 1959, published as Lime Creek at Mason City.

REVISED RECORDS.--WSP 825: 1935-36. WSP 1438: Drainage area. WSP 1558: 1933-37, 1943 (M), 1945, 1948.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,069.59 ft above NGVD. Prior to Oct. 15, 1934, nonrecording gage at datum 6.47 ft lower. Oct. 15 to Nov. 6, 1934, nonrecording gage at different datum, and Nov. 7, 1934, to Mar. 22, 1935, nonrecording gage at present datum.

REMARKS.--Estimated daily discharges: Nov. 15-19, Dec. 9-11, Jan. 5-12, Jan. 31 to Feb. 10, Mar. 16-19, 21-27, Mar. 30 to Apr. 2. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--57 years, 258 ft^3/s, 6.66 in/yr, 186,900 acre-ft/yr; median of yearly mean discharges, 210 ft^3/s, 5.4 in/yr, 152,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft^3/s Mar. 30, 1933, gage height, 15.7 ft; no flow part of each day Aug. 14, 15, 21, 22, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	unknown	*929	(a) *5.30				

(a) High water mark

No flow part of each day Aug. 14, 15, 21, 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	21	35	20	30	14	200	142	34	23	14	13
2	33	20	32	18	22	14	161	130	34	20	18	18
3	29	23	31	17	18	13	149	115	32	17	16	18
4	25	23	27	17	13	14	146	108	29	14	12	22
5	23	26	30	19	16	20	137	106	26	12	11	21
6	21	23	29	18	22	21	132	96	23	8.3	9.6	23
7	22	20	29	16	27	14	127	89	24	6.3	7.0	21
8	20	17	23	17	31	15	122	90	23	5.8	4.9	24
9	18	17	19	18	27	12	115	92	23	4.8	5.5	23
10	19	19	19	17	33	112	103	82	23	3.5	5.2	22
11	18	16	20	16	35	831	99	74	22	15	6.5	21
12	16	19	20	17	36	526	95	68	24	19	3.5	20
13	16	22	21	15	31	269	88	65	23	16	2.0	20
14	16	22	24	13	30	332	85	64	20	14	2.0	17
15	15	25	23	13	27	356	81	60	19	12	2.1	15
16	16	40	17	13	26	235	75	59	18	9.5	3.7	14
17	18	60	16	14	23	207	73	54	18	8.0	5.7	14
18	19	50	17	16	22	200	74	52	18	18	4.8	13
19	19	40	17	19	20	174	69	53	17	42	1.2	9.6
20	18	34	26	21	20	155	70	50	15	50	2.7	9.6
21	20	36	29	21	20	100	70	46	13	62	2.4	10
22	20	34	38	26	29	89	72	43	15	62	2.1	11
23	22	42	41	28	40	100	79	43	14	52	7.0	8.6
24	21	40	44	27	32	150	84	46	14	41	6.2	8.5
25	22	38	32	27	17	290	80	48	18	34	3.8	11
26	20	40	28	26	17	340	82	46	25	28	9.9	8.8
27	21	44	32	27	17	400	109	41	34	23	9.3	6.8
28	19	21	24	27	16	409	147	39	37	18	11	6.0
29	19	37	22	27	---	361	152	38	31	16	12	5.7
30	21	36	20	28	---	304	154	37	28	16	12	4.4
31	21	---	21	35	---	253	---	35	---	15	12	---
TOTAL	648	905	806	633	697	6330	3230	2111	694	685.2	225.1	439.0
MEAN	20.9	30.2	26.0	20.4	24.9	204	108	68.1	23.1	22.1	7.26	14.6
MAX	41	60	44	35	40	831	200	142	37	62	18	24
MIN	15	16	16	13	13	12	69	35	13	3.5	1.2	4.4
AC-FT	1290	1800	1600	1260	1380	12560	6410	4190	1380	1360	446	871
CFSM	.04	.06	.05	.04	.05	.39	.20	.13	.04	.04	.01	.03
IN.	.05	.06	.06	.04	.05	.45	.23	.15	.05	.05	.02	.03

CAL YR 1988 TOTAL 26526.9 MEAN 72.5 MAX 586 MIN 3.0 AC-FT 52620 CFSM .14 IN. 1.88
WTR YR 1989 TOTAL 17403.3 MEAN 47.7 MAX 831 MIN 1.2 AC-FT 34520 CFSM .09 IN. 1.23

05460000 CLEAR LAKE AT CLEAR LAKE, IA

LOCATION.--Lat 43°08'01", long 93°22'57", in SE1/4 NE1/4 sec.13, T.96 N., R.22 W., Cerro Gordo County, Hydrologic Unit 07080203, at the public bathing beach in the town of Clear Lake near dam across Clear Creek.

DRAINAGE AREA.--22.6 mi^2.

PERIOD OF RECORD.--May 1933 to current year. No winter records 1933-52. Record fragmentary November 1952 to June 1959.

GAGE.--Water-stage recorder. Datum of gage is 1,222.24 ft above NGVD, and 4.60 ft below crest of spillway of dam at outlet. See WSP 1708 for history of changes prior to June 25, 1959.

REMARKS.--Lake is formed by concrete dam on Clear Creek with ungated overflow spillway 50 ft long at elevation 1,226.84 ft above NGVD. Dam constructed in 1903. A previous outlet works had been constructed in 1887. Lake is used for conservation and recreation. Area of lake is approximately 3,600 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 5.94 ft July 3, 1951; minimum observed, 1.10 ft Sept. 30, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 2.63 ft May 4; minimum, 1.10 ft Sept. 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.42	2.15	2.27	---	---	---	---	2.49	2.20	1.93	1.60	1.36
2	2.40	2.15	---	---	---	---	---	2.48	2.20	1.93	1.58	1.34
3	2.39	2.14	---	---	---	---	---	2.48	2.18	1.93	1.56	1.31
4	2.35	2.13	---	---	---	---	---	2.49	2.17	1.89	1.54	1.38
5	2.33	2.12	---	---	---	---	---	2.51	2.16	1.88	1.52	1.39
6	2.32	2.13	---	---	---	---	---	2.45	2.15	1.87	1.47	1.37
7	2.32	2.12	---	---	---	---	---	2.43	2.14	1.83	1.43	1.39
8	2.30	2.12	---	---	---	---	---	2.40	2.13	1.79	1.42	1.39
9	2.29	---	---	---	---	---	---	2.41	2.10	1.78	1.40	1.40
10	2.29	---	---	---	---	---	---	2.42	2.08	1.78	1.39	1.39
11	2.28	---	---	---	---	---	---	2.41	2.06	1.79	1.36	1.37
12	2.27	---	---	---	---	---	2.52	2.40	2.08	1.79	1.34	1.33
13	2.26	---	---	---	---	---	2.53	2.39	2.07	1.78	1.33	1.31
14	2.26	---	---	---	---	---	2.50	2.38	2.02	1.78	1.32	1.31
15	2.25	2.12	2.24	---	---	---	2.49	2.38	2.00	1.77	1.29	1.31
16	2.24	---	2.26	---	---	---	2.49	2.37	1.99	1.76	1.27	1.29
17	2.24	---	2.25	---	---	---	2.47	2.35	1.98	1.75	1.27	1.29
18	2.24	2.20	2.26	---	---	---	2.47	2.34	1.97	1.74	1.28	1.32
19	2.24	---	---	---	---	---	2.46	2.35	1.96	1.73	1.28	1.30
20	2.23	---	---	---	---	---	2.45	2.36	1.93	1.73	1.27	1.29
21	2.23	---	---	---	---	---	2.42	2.33	1.92	1.72	1.27	1.28
22	2.22	---	---	---	---	---	2.41	2.30	1.93	1.70	1.28	1.28
23	2.21	---	---	---	---	---	2.42	2.30	1.93	1.69	1.44	1.23
24	2.21	---	---	---	---	---	2.43	2.32	1.91	1.68	1.41	1.23
25	2.20	2.25	---	---	---	---	2.45	2.30	1.94	1.66	1.38	1.20
26	2.19	---	---	---	---	---	2.44	2.29	1.98	1.65	1.44	1.18
27	2.18	---	---	---	---	---	2.46	2.24	1.98	1.64	1.46	1.16
28	2.19	---	---	---	---	---	2.51	2.22	1.97	1.61	1.48	1.16
29	2.17	---	---	---	---	---	2.54	2.21	1.94	1.62	1.46	1.13
30	2.17	---	---	---	---	---	2.50	2.22	1.93	1.61	1.42	1.11
31	2.16	---	---	---	---	---	---	2.21	---	1.60	1.40	---
MEAN	2.26	---	---	---	---	---	---	2.36	2.03	1.76	1.40	1.29
MAX	2.42	---	---	---	---	---	---	2.51	2.20	1.93	1.60	1.40
MIN	2.16	---	---	---	---	---	---	2.21	1.91	1.60	1.27	1.11

05462000 SHELL ROCK RIVER AT SHELL ROCK, IA

LOCATION.--Lat 42°39'10", long 92°35'45", in NE1/4 NW1/4 sec.11, T.91 N., R.15 W., Butler County, Hydrologic Unit 07080202 on right bank 400 ft upstream from bridge on county highway C45 in Shell Rock, 2.2 mi downstream from Curry Creek, and 10.4 mi upstream from mouth.

DRAINAGE AREA.--1,746 mi^2.

PERIOD OF RECORD.--June 1953 to current year. Prior to July 1953, monthly discharge only, published in WSP 1728.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Rockfill dam since Oct. 19, 1957. Datum of gage is 885.34 ft above NGVD.

REMARKS.--Estimated daily discharges: Feb. 5-14, Feb. 22 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Diurnal fluctuation at low stages caused by power plant upstream at Greene. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--36 years, 959 ft^3/s, 7.46 in/yr, 694,800 acre-ft/yr; median of yearly mean discharges, 780 ft^3/s, 6.1 in/yr, 565,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,500 ft^3/s Mar. 28, 1961, gage height, 16.26 ft; minimum daily discharge, 37 ft^3/s Sept. 10, 1988 result of dam construction.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1856 reached a stage of 17.7 ft at bridge 400 ft downstream, from information provided by U.S. Army Corps of Engineers, discharge, about 45,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	1400	*2,340	*9.62				

Minimum discharge, 57 ft^3/s Feb. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	139	118	160	155	91	140	858	474	206	157	82	73
2	144	109	195	145	76	144	770	455	196	139	78	75
3	147	115	222	141	67	150	698	428	196	121	74	75
4	137	127	207	133	75	153	659	415	195	102	72	79
5	127	135	205	147	84	157	646	407	183	87	69	83
6	119	124	209	157	94	167	629	380	174	81	69	107
7	117	109	202	149	100	180	594	371	170	78	68	121
8	112	117	153	102	110	190	582	374	175	75	66	182
9	115	122	164	120	100	230	553	351	172	74	66	148
10	120	132	166	117	123	434	518	328	162	72	66	146
11	118	138	127	113	120	1490	497	312	147	82	64	137
12	106	151	141	110	118	2130	475	301	148	78	63	128
13	101	167	160	110	123	1800	446	287	143	81	63	121
14	98	156	176	110	120	1160	431	276	129	106	63	116
15	95	185	131	110	123	1400	410	263	125	92	63	106
16	106	220	123	110	118	1540	394	253	115	82	62	94
17	124	234	151	112	114	847	387	240	114	78	62	89
18	122	269	151	112	114	627	362	243	108	89	62	83
19	118	263	144	115	108	560	345	261	108	120	64	79
20	124	257	164	112	106	635	337	253	93	229	65	77
21	131	233	177	84	106	642	333	234	84	316	62	72
22	127	162	193	73	108	593	324	223	87	289	61	85
23	121	176	210	75	112	591	323	219	93	263	63	79
24	131	222	215	75	120	640	322	219	89	242	64	70
25	121	233	184	76	122	862	324	219	103	213	66	74
26	117	239	203	78	128	1150	322	217	134	110	67	78
27	113	232	206	75	130	1640	328	214	140	120	67	75
28	121	192	145	75	136	1620	412	215	161	117	68	79
29	111	169	156	76	---	1250	475	216	157	105	72	89
30	107	192	164	81	---	1110	486	226	159	95	68	79
31	109	---	165	98	---	969	---	220	---	87	69	---
TOTAL	3698	5298	5369	3346	3046	25201	14240	9094	4266	3980	2068	2899
MEAN	119	177	173	108	109	813	475	293	142	128	66.7	96.6
MAX	147	269	222	157	136	2130	858	474	206	316	82	182
MIN	95	109	123	73	67	140	322	214	84	72	61	70
AC-FT	7330	10510	10650	6640	6040	49990	28250	18040	8460	7890	4100	5750
CFSM	.07	.10	.10	.06	.06	.47	.27	.17	.08	.07	.04	.06
IN.	.08	.11	.11	.07	.06	.54	.30	.19	.09	.08	.04	.06

CAL YR 1988 TOTAL 119101 MEAN 325 MAX 1570 MIN 57 AC-FT 236200 CFSM .19 IN. 2.54
WTR YR 1989 TOTAL 82505 MEAN 226 MAX 2130 MIN 61 AC-FT 163600 CFSM .13 IN. 1.76

05463000 BEAVER CREEK AT NEW HARTFORD, IA

LOCATION.--Lat 42°30'50", long 92°37'55", in SE1/4 SE1/4 sec.28, T.90 N., R.15 W., Butler County, Hydrologic Unit 07080205, on right bank 5 ft from right end of bridge on county highway T55, 0.2 mi north of New Hartford, and 8 mi upstream from mouth.

DRAINAGE AREA.--347 mi^2.

PERIOD OF RECORD.--October 1945 to current year. Prior to April 1948, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1948-49. WSP 1708: 1947 (M).

GAGE.--Water-stage recorder. Datum of gage is 882.44 ft above NGVD. Prior to July 14, 1959, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 29 to Mar. 23, Apr. 21, and May 8-31. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--44 years, 196 ft^3/s, 7.67 in/yr, 142,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft^3/s June 13, 1947, gage height, 13.5 ft, from graph based on gage readings, from rating curve extended above 14,000 ft^3/s; minimum daily dischargee, 2.0 ft^3/s Sept. 30, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	2100	Ice jam	*9.57	Mar. 12	----	*1,800	Ice jam

Minimum daily discharge, 2.0 ft^3/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.6	9.0	16	3.3	25	19	68	78	24	14	6.7	4.0
2	8.2	8.7	19	3.2	20	20	67	62	23	14	6.2	3.5
3	8.6	8.7	12	3.0	15	21	64	55	24	13	5.4	3.8
4	6.3	8.5	18	2.9	13	22	60	49	23	12	5.3	5.4
5	5.9	8.3	12	3.0	13	23	60	50	21	11	4.7	5.0
6	5.8	8.7	10	3.8	12	25	59	48	20	9.9	4.3	4.3
7	6.0	8.7	11	5.0	11	27	56	45	18	8.9	3.7	4.3
8	6.2	9.2	12	4.5	11	28	71	45	28	8.2	3.5	14
9	5.9	9.4	11	4.0	10	51	71	42	55	7.5	3.3	19
10	8.0	9.4	9.1	3.8	10	250	71	40	35	6.8	3.2	36
11	7.0	9.2	8.0	3.6	11	900	68	38	29	10	3.0	55
12	6.0	10	8.0	3.4	12	1300	57	36	27	10	3.2	41
13	5.9	14	7.6	3.4	12	540	59	33	24	7.8	3.2	30
14	5.8	15	7.2	3.3	12	370	60	31	22	7.1	3.6	24
15	6.2	16	6.8	3.2	12	420	51	29	20	6.6	3.2	20
16	6.2	23	6.6	3.2	13	400	50	27	19	6.3	3.1	16
17	7.0	26	6.8	3.5	13	280	47	25	18	6.1	2.6	12
18	7.4	22	6.8	3.6	14	250	43	23	17	9.1	2.7	10
19	7.1	20	6.4	4.1	15	260	41	20	16	9.2	3.6	10
20	8.1	16	6.2	4.8	16	230	40	18	15	10	5.2	7.9
21	8.2	14	5.8	4.5	16	180	43	14	14	10	3.7	5.3
22	8.2	13	5.4	4.8	17	160	40	13	13	8.9	3.5	4.8
23	8.2	15	5.0	6.0	17	135	41	11	15	9.3	4.6	4.2
24	8.2	16	4.5	7.8	18	126	39	11	13	8.0	4.1	4.0
25	8.3	15	4.2	9.4	18	109	38	14	16	7.6	4.0	3.8
26	8.4	15	3.9	9.0	19	100	37	18	20	7.9	4.8	3.3
27	7.1	15	3.7	8.0	20	99	57	18	24	11	6.8	2.7
28	7.1	14	3.8	7.4	19	96	177	15	23	8.2	7.1	2.4
29	7.1	13	3.6	8.8	---	88	128	16	19	8.2	5.0	2.3
30	7.3	12	3.6	13	---	79	98	18	16	7.9	3.7	2.0
31	8.2	---	3.7	20	---	73	---	23	---	7.5	3.8	---
TOTAL	221.5	401.8	247.7	171.3	414	6681	1861	965	651	282.0	130.8	360.0
MEAN	7.15	13.4	7.99	5.53	14.8	216	62.0	31.1	21.7	9.10	4.22	12.0
MAX	8.6	26	19	20	25	1300	177	78	55	14	7.1	55
MIN	5.8	8.3	3.6	2.9	10	19	37	11	13	6.1	2.6	2.0
AC-FT	439	797	491	340	821	13250	3690	1910	1290	559	259	714
CFSM	.02	.04	.02	.02	.04	.62	.18	.09	.06	.03	.01	.03
IN.	.02	.04	.03	.02	.04	.72	.20	.10	.07	.03	.01	.04

CAL YR 1988 TOTAL 17337.3 MEAN 47.4 MAX 274 MIN 3.6 AC-FT 34390 CFSM .14 IN. 1.86
WTR YR 1989 TOTAL 12387.1 MEAN 33.9 MAX 1300 MIN 2.0 AC-FT 24570 CFSM .10 IN. 1.33

05463050 CEDAR RIVER AT CEDAR FALLS, IA
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

LOCATION.--Lat 42°32'20", Long 92°26'58", in NW1/4 NE1/4 sec.12, T.89 N, R.14W., Black Hawk County, Hydrologic Unit 07080205, at bridge on U.S. Highway 20 at Cedar Falls, 1.1 mi upstream from Dry Run, and at mile 196.0 upstream from mouth of Iowa River.

DRAINAGE AREA.--4,734 mi^2.

PERIOD OF RECORD.--October 1975 to September 1979, May 1984 to September 1985, October 1986 to current year.

REMARKS.--Water discharge estimated on basis of records at gaging station 8.1 mi downstream at Waterloo. No significant inflow between gaging station and sampling site.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TEMPER-ATURE AIR (DEG C) (00020)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT 21...	1000	572	510	8.60	9.5	13.0	6.5	11.8	107	739	210	2000
DEC 15...	1145	499	702	8.40	0.0	-12.5	3.2	--	--	--	K23	80
MAR 20...	1115	2870	348	8.20	0.0	2.0	14	12.0	84	746	560	2000
MAY 04...	0830	1550	580	8.70	13.5	13.0	7.0	9.6	96	736	K40	130
JUN 30...	1215	532	450	8.80	27.0	21.0	9.8	10.2	131	746	340	100
AUG 24...	0730	320	392	8.40	24.5	17.0	4.5	9.2	114	742	92	140

DATE	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
OCT 21...	52	220	49	24	20	16	0.6	10	169	3	201	50
DEC 15...	62	320	81	28	23	13	0.6	11	--	--	--	57
MAR 20...	37	150	42	11	6.9	9	0.3	8.7	--	--	--	31
MAY 04...	81	260	65	24	13	10	0.4	4.4	175	3	208	55
JUN 30...	33	170	32	22	20	19	0.7	8.8	129	9	140	44
AUG 24...	34	170	32	21	17	18	0.6	4.3	--	--	--	37

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 21...	28	0.20	1.3	290	290	0.39	448	--	1.10	0.010	<0.010	<0.010
DEC 15...	37	0.30	9.8	415	420	0.56	559	1.2	4.20	0.030	0.030	0.010
MAR 20...	14	0.10	11	218	210	0.30	1690	1.4	3.30	0.100	1.30	1.30
MAY 04...	35	0.20	4.9	349	310	0.47	1460	0.67	0.100	--	--	0.030
JUN 30...	31	0.20	2.0	230	243	0.31	330	2.0	<0.100	<0.010	0.040	0.030
AUG 24...	26	0.20	2.2	232	221	0.32	200	2.0	0.170	0.020	0.040	0.020

K Results based on colony count outside ideal range.

05463050 CEDAR RIVER AT CEDAR FALLS, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. THAN .062 MM (70331)	ARSENIC DIS- (UG/L AS AS) (01000)	ALUM- INUM, DIS- (UG/L AS AL) (01106)	BARIUM, DIS- (UG/L AS BA) (01005)	BERYL- LIUM, DIS- (UG/L AS BE) (01010)	CADMIUM DIS- (UG/L AS CD) (01025)
OCT 21...	0.40	<0.010	0.010	0.050	20	31	97	3	<10	81	<0.5	<1
DEC 15...	1.2	0.150	0.180	0.240	8	11	100	--	--	--	--	--
MAR 20...	2.7	0.380	0.460	0.500	--	--	--	3	50	98	<0.5	<1
MAY 04...	0.70	--	0.041	0.080	50	209	92	--	--	--	--	--
JUN 30...	2.0	<0.010	0.030	0.090	23	33	92	--	--	--	--	--
AUG 24...	2.0	0.010	0.020	0.100	20	17	100	5	40	63	<0.5	<1

DATE	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)
OCT 21...	<1	<3	1	19	<5	9	3	<0.1	<10	1	1
DEC 15...	--	--	--	--	--	--	--	--	--	--	--
MAR 20...	<1	<3	5	92	<5	<4	29	<0.1	<10	2	<1
MAY 04...	--	--	--	--	--	--	--	--	--	--	--
JUN 30...	--	--	--	--	--	--	--	--	--	--	--
AUG 24...	1	<3	11	10	2	7	2	0.3	<10	2	<1

[Pesticide concentration expressed as total recoverable]

DATE	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)	BUTY- LATE (UG/L) (99901)
OCT 21...	<1.0	170	<6	4	--	--	--	--	--	--	--
DEC 15...	--	--	--	--	--	--	--	--	--	--	--
MAR 20...	<1.0	85	<6	19	0.67	<0.10	0.29	<0.10	<0.10	<0.10	<0.10
MAY 04...	--	--	--	--	0.21	0.13	0.57	<0.10	<0.10	<0.10	<0.10
JUN 30...	--	--	--	--	0.48	0.12	0.12	<0.10	<0.10	<0.10	<0.10
AUG 24...	<1.0	130	<6	9	--	--	--	--	--	--	--

05463500 BLACK HAWK CREEK AT HUDSON, IA

LOCATION.--Lat 42°24'28", long 92°27'47", in SW1/4 NE1/4 sec.27, T.88 N., R.14 W., Black Hawk County, Hydrologic Unit 07080205, on left bank 35 ft downstream from bridge on State Highway 58, 0.2 mi northwest of Chicago and Great Western Railway tracks at the west edge of Hudson, 4.5 mi upstream from Prescotts Creek, and 9.6 mi upstream from mouth.

DRAINAGE AREA.--303 mi^2.

PERIOD OF RECORD.--April 1952 to current year.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 865.03 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 22 to Mar. 27 and Apr. 3, 4. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--37 years, 168 ft^3/s, 7.53 in/yr, 121,700 acre-ft/yr; median of yearly mean discharges, 150 ft^3/s, 6.7 in/yr, 109,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,300 ft^3/s July 9, 1969, gage height, 18.23 ft; minimum daily discharge, 0.12 ft^3/s Jan. 26, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	----	*570	Ice jam	Mar. 12	0130	Ice jam	*9.59

Minimum discharge, 1.3 ft^3/s Apr. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.6	13	21	7.0	31	17	42	42	71	8.8	3.6	6.1
2	8.1	12	18	6.8	26	18	33	37	39	8.1	3.3	3.8
3	8.8	11	17	7.0	22	19	35	33	30	7.6	3.3	2.4
4	6.8	12	18	7.2	19	20	38	31	25	6.9	4.6	2.8
5	6.5	13	17	6.8	15	21	40	31	21	5.7	3.5	4.3
6	7.7	13	15	8.2	16	21	29	28	18	5.1	2.7	2.7
7	7.9	12	13	11	15	26	25	26	16	4.5	2.4	3.3
8	8.7	12	14	8.3	14	23	26	24	14	4.3	2.1	9.2
9	8.2	11	13	7.4	12	20	22	23	14	4.1	1.8	23
10	8.3	12	13	6.6	13	142	21	21	14	3.7	1.6	29
11	7.1	11	12	6.5	13	440	18	19	13	4.0	1.5	25
12	6.3	15	12	6.1	14	390	19	18	16	4.4	1.5	21
13	6.6	18	11	5.5	13	310	17	17	17	4.6	1.5	16
14	7.3	19	11	5.2	15	332	16	15	15	3.9	1.6	13
15	8.3	18	11	5.0	16	240	15	14	14	3.8	1.8	10
16	8.4	32	10	6.0	17	220	24	13	14	3.7	1.7	6.3
17	11	35	10	7.2	18	200	23	13	14	3.8	1.5	5.1
18	11	25	11	8.0	18	160	18	13	13	7.1	1.4	4.5
19	11	21	10	9.1	18	140	19	15	13	9.7	1.8	3.5
20	11	19	9.8	11	19	130	19	15	12	8.7	3.6	3.0
21	12	19	9.3	10	18	130	19	13	11	5.8	2.8	2.6
22	12	22	9.0	11	18	125	20	11	9.9	5.4	2.6	2.8
23	12	20	8.5	15	18	120	22	11	10	5.1	2.2	2.1
24	12	17	8.4	21	18	115	21	122	9.9	5.2	2.0	2.2
25	11	17	8.2	28	18	110	20	93	13	5.2	2.0	2.0
26	11	19	7.8	26	19	90	18	45	16	5.2	2.2	2.0
27	12	17	7.5	24	20	69	20	33	16	4.5	4.3	2.4
28	11	14	7.6	23	18	60	86	27	14	3.7	2.9	2.0
29	10	15	7.0	32	---	48	75	24	11	3.7	2.3	1.7
30	8.9	19	6.8	44	---	46	51	21	9.5	4.4	1.6	1.6
31	10	---	6.8	36	---	44	---	115	---	4.5	2.2	---
TOTAL	289.7	513	353.7	415.9	491	3846	851	963	523.3	165.2	73.9	215.4
MEAN	9.35	17.1	11.4	13.4	17.5	124	28.4	31.1	17.4	5.33	2.38	7.18
MAX	12	35	21	44	31	440	86	122	71	9.7	4.6	29
MIN	6.3	11	6.8	5.0	12	17	15	11	9.5	3.7	1.4	1.6
AC-FT	575	1020	702	825	974	7630	1690	1910	1040	328	147	427
CFSM	.03	.06	.04	.04	.06	.41	.09	.10	.06	.02	.01	.02
IN.	.04	.06	.04	.05	.06	.47	.10	.12	.06	.02	.01	.03

CAL YR 1988 TOTAL 22029.5 MEAN 60.2 MAX 410 MIN 4.0 AC-FT 43700 CFSM .20 IN. 2.70
WTR YR 1989 TOTAL 8701.1 MEAN 23.8 MAX 440 MIN 1.4 AC-FT 17260 CFSM .08 IN. 1.07

05464000 CEDAR RIVER AT WATERLOO, IA

LOCATION.--Lat 42°29'44", long 92°20'03", in NW1/4 NW1/4 sec.25, T.89 N., R.13 W., Black Hawk County, Hydrologic Unit 07080205, on left bank at foot of East Seventh Street, 0.3 mi upstream from Eleventh Avenue bridge in Waterloo, 1.1 mi downstream from Black Hawk Creek, and at mile 187.9 upstream from mouth of Iowa River.

DRAINAGE AREA.--5,146 mi^2.

PERIOD OF RECORD.--October 1940 to current year. Prior to April 1941, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1950.

GAGE.--Water-stage recorder. Datum of gage is 824.14 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 8-12, 15-18, Jan. 8-10, Feb. 2-12, and Feb. 22,23. Records good except those for estimated daily discharges, which are poor. Slight diurnal fluctuation during low flow caused by powerplant upstream from station. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--49 years, 2,986 ft^3/s, 7.88 in/yr, 2,163,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 76,700 ft^3/s Mar. 29, 1961, gage height, 21.86 ft; minimum daily discharge, 152 ft^3/s Jan. 28, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 16, 1929, reached a stage of about 20 ft , determined by U. S. Army Corps of Engineers, from information by City of Waterloo, discharge, 65,000 ft^3/s. Flood of Apr. 2, 1933, reached a stage of about 19.5 ft from information by City of Waterloo, discharge, 61,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 16	1045	*6,730	*7.44				

Minimum discharge, 288 ft^3/s Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	624	519	576	533	779	457	2490	1650	830	520	381	437
2	596	537	484	533	600	404	2120	1790	746	510	370	450
3	577	570	566	492	500	430	1880	1680	737	492	389	428
4	579	575	684	483	450	449	1550	1550	735	467	376	681
5	567	567	712	550	520	551	1570	1480	699	445	358	959
6	533	543	756	628	500	500	1750	1250	637	437	339	875
7	615	547	748	611	480	456	1890	1280	621	427	330	749
8	559	558	500	560	460	460	1750	1230	615	411	318	1020
9	529	568	380	500	450	518	1540	1250	603	394	316	891
10	538	584	430	530	450	1200	1420	1160	593	390	316	701
11	532	557	380	504	480	2750	1330	1070	579	400	308	663
12	587	627	440	479	540	4910	1280	1090	621	412	302	621
13	526	605	565	469	560	5150	1200	999	578	402	298	580
14	528	608	591	465	541	5660	1130	976	552	387	302	552
15	522	661	500	465	530	6060	1080	903	514	403	306	526
16	538	804	460	464	516	6390	1030	891	512	400	301	507
17	553	777	450	465	504	5610	1010	881	494	393	295	477
18	562	826	500	471	504	3500	986	881	483	462	294	463
19	539	875	552	496	494	2990	960	973	483	455	332	445
20	547	938	592	527	493	2790	939	943	474	430	321	429
21	559	917	560	533	501	2060	932	851	461	477	310	414
22	527	810	582	551	480	2050	950	807	456	606	306	412
23	539	760	609	588	470	1970	1000	788	452	633	381	390
24	604	781	658	599	474	1910	970	893	450	602	320	380
25	667	858	579	607	480	2040	991	946	480	544	307	373
26	550	961	564	607	475	2800	1030	807	523	503	312	374
27	540	899	643	583	469	5290	1060	764	528	457	311	351
28	601	795	706	614	469	5970	1250	754	516	420	312	355
29	531	717	622	696	---	4480	1480	746	522	419	341	355
30	489	656	556	745	---	3590	1580	741	524	408	315	342
31	495	---	554	779	---	3000	---	745	---	388	386	---
TOTAL	17253	21000	17499	17127	14169	86395	40148	32769	17018	14094	10153	16200
MEAN	557	700	564	552	506	2787	1338	1057	567	455	328	540
MAX	667	961	756	779	779	6390	2490	1790	830	633	389	1020
MIN	489	519	380	464	450	404	932	741	450	387	294	342
AC-FT	34220	41650	34710	33970	28100	171400	79630	65000	33760	27960	20140	32130
CFSM	.11	.14	.11	.11	.10	.54	.26	.21	.11	.09	.06	.10
IN.	.12	.15	.13	.12	.10	.62	.29	.24	.12	.10	.07	.12

CAL YR 1988 TOTAL 444680 MEAN 1215 MAX 5120 MIN 380 AC-FT 882000 CFSM .24 IN. 3.21
WTR YR 1989 TOTAL 303825 MEAN 832 MAX 6390 MIN 294 AC-FT 602600 CFSM .16 IN. 2.20

05464500 CEDAR RIVER AT CEDAR RAPIDS, IA

LOCATION.--Lat 41°58'14", long 91°40'01", in SE1/4 NW1/4 sec.28, T.83 N., R.7 W., Linn County, Hydrologic Unit 07080205, on right bank 400 ft upstream from bridge on Eighth Avenue in Cedar Rapids, 2.7 mi upstream from Prairie Creek, and at mile 112.7 upstream from mouth of Iowa River.

DRAINAGE AREA.--6,510 mi^2.

PERIOD OF RECORD.--October 1902 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 955: 1924. WSP 1308: 1904, 1906-13, 1915, 1917, 1919-24, 1926, 1930,. WSP 1438: Drainage area. WSP 1558: 1915-18 (M), 1920 (M), 1922 (M), 1929, 1933, 1943.

GAGE.--Water-stage recorder. Datum of gage is 700.47 ft above NGVD. Prior to Aug. 20, 1920, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 16, 17, 28, 29, Jan. 8-10, Feb. 2-12, and Feb. 16-24. Records good except those for estimated daily discharges, which are poor. Flow regulated by city hydroelectric dam 1/2 mile upstream since June 1979. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U. S. Geological Survey gage-height telemeter and U. S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--87 years, 3,447 ft^3/s, 7.19 in/yr, 2,497,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 73,000 ft^3/s Mar. 31, 1961, gage height, 19.66 ft; maximum gage height, 20.0 ft Mar. 18, 1929; minimum discharge 53 ft^3/s Jan. 6, 1950, caused by construction operations upstream; minimum daily, 212 ft^3/s Dec. 10, 1949.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1851 reached a stage of about 20 ft, discharge, 65,000 ft^3/s, estimated.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 16	1945	*8,130	*5.53				

Minimum daily discharge, 349 ft^3/s Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	724	511	670	592	1500	532	3440	1950	1010	589	471	467
2	692	482	667	601	800	518	2900	2020	899	571	453	469
3	659	523	799	571	620	515	2660	2080	960	582	447	521
4	633	565	686	530	560	571	2290	2000	865	572	438	565
5	594	595	637	559	500	546	2030	2040	817	574	465	574
6	611	544	756	585	580	565	1870	1880	827	541	458	667
7	602	552	753	695	540	557	1910	1740	781	451	419	938
8	582	565	709	800	520	568	2100	1550	746	502	401	1260
9	597	584	360	560	480	637	2090	1630	737	488	409	1450
10	577	599	453	510	470	1810	1850	1580	695	467	392	1300
11	524	570	416	535	520	3360	1670	1520	698	443	378	1200
12	519	636	371	576	620	3900	1780	1430	783	433	376	962
13	515	623	422	549	720	4580	1240	1340	792	438	377	869
14	544	647	530	522	671	5440	1790	1340	744	403	424	830
15	534	744	613	515	648	6320	1450	1270	695	399	377	794
16	540	895	520	500	620	6840	1340	1180	670	414	363	765
17	575	800	470	500	600	7070	1340	1110	642	529	357	727
18	560	808	522	504	570	5010	1230	1090	622	618	349	677
19	550	813	559	524	560	4300	1210	1100	695	595	385	640
20	563	824	634	610	550	4380	1120	1080	483	570	431	611
21	571	834	651	712	540	3970	1210	1070	598	547	422	581
22	557	862	652	718	520	3840	1360	1050	587	531	407	573
23	665	883	644	699	500	3440	2350	972	555	561	414	523
24	554	835	658	723	520	2860	1920	1070	549	638	392	519
25	532	810	649	779	532	2370	1650	1470	547	670	429	516
26	544	864	679	791	542	2310	1530	1250	582	659	446	493
27	616	928	710	747	567	2450	1580	1100	601	619	414	470
28	559	909	580	809	538	4090	1790	1020	651	568	393	462
29	520	931	530	1370	---	5810	1670	938	564	545	441	457
30	550	852	537	1910	---	5280	1760	887	568	503	386	450
31	717	---	556	1560	---	4020	---	890	---	489	406	---
TOTAL	18080	21588	18393	22156	16908	98459	54130	42647	20963	16509	12720	21330
MEAN	583	720	593	715	604	3176	1804	1376	699	533	410	711
MAX	724	931	799	1910	1500	7070	3440	2080	1010	670	471	1450
MIN	515	482	360	500	470	515	1120	887	483	399	349	450
AC-FT	35860	42820	36480	43950	33540	195300	107400	84590	41580	32750	25230	42310
CFSM	.09	.11	.09	.11	.09	.49	.28	.21	.11	.08	.06	.11
IN.	.10	.12	.11	.13	.10	.56	.31	.24	.12	.09	.07	.12

CAL YR 1988 TOTAL 532757 MEAN 1456 MAX 6890 MIN 360 AC-FT 1057000 CFSM .22 IN. 3.04
WTR YR 1989 TOTAL 363883 MEAN 997 MAX 7070 MIN 349 AC-FT 721800 CFSM .15 IN. 2.08

05465000 CEDAR RIVER NEAR CONESVILLE, IA

LOCATION.--Lat 41°24'36", long 91°17'06", in SW1/4 SW1/4 sec.2, T.76 N., R.4 W., Muscatine County, Hydrologic Unit 07080206, on right bank 10 ft downstream from bridge on county highway G28, 3.4 mi northeast of Conesville, 5.2 mi downstream from Wapsinonoc Creek, 10.7 mi upstream from mouth, and at mile 39.8 upstream from mouth of Iowa River.

DRAINAGE AREA.--7,785 mi^2.

PERIOD OF RECORD.--September 1939 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1956.

GAGE.--Water-stage recorder. Datum of gage is 581.95 ft above NGVD. Prior to Feb. 2, 1940, and Apr. 11, 1952, to July 1, 1954, nonrecording gage, Feb. 2, 1940, to Apr. 10, 1952, and July 2, 1954, to Sept. 16, 1963, water-stage recorder, at site 150 ft downstream on left bank at same datum.

REMARKS.-- Estimated daily discharges: Dec. 11 to Jan. 31 and Feb. 3 to Mar. 16. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--50 years, 4,681 ft^3/s, 8.16 in/yr, 3,391,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 70,800 ft^3/s Apr. 2, 1961, gage height, 16.62 ft; maximum gage height, 16.85 ft Apr. 12, 1965; minimum daily discharge, 250 ft^3/s Nov. 28, 1955, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1929 reached a stage of 15.8 ft, from information by local residents to U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 18	0515	*6,650	*8.61				

Minimum discharge, 554 ft^3/s Aug. 10, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	978	806	1160	800	2490	800	4960	2230	1680	882	747	857
2	981	912	1140	820	2090	780	4350	2410	1860	883	725	865
3	948	840	1030	800	1500	760	3950	2470	1740	866	701	877
4	898	781	994	760	1000	740	3610	2440	1900	845	734	795
5	859	809	1030	720	800	800	3320	2490	1640	843	1130	782
6	842	827	995	740	720	770	3050	2420	1410	840	855	963
7	808	843	942	1000	700	780	2830	2380	1300	861	748	940
8	797	837	995	1200	800	760	2750	2220	1260	795	712	1150
9	779	828	1040	1400	740	810	2730	2150	1210	719	658	1780
10	788	879	1080	800	680	900	2790	2070	1160	737	616	2920
11	791	889	600	800	640	850	2730	2030	1140	716	593	2990
12	791	917	660	840	680	1000	2490	1970	1170	710	585	2330
13	751	948	620	820	740	2000	2360	1890	1430	693	571	1970
14	737	961	600	910	800	3000	2330	1810	1600	646	573	1680
15	754	950	700	840	860	3800	2120	1730	1300	628	643	1490
16	764	987	840	800	840	5720	2250	1700	1190	625	700	1410
17	795	1080	900	760	820	6110	2050	1630	1110	584	634	1410
18	796	1200	840	740	780	6550	2000	1580	1060	617	581	1270
19	805	1130	800	760	760	5910	1970	1540	1020	810	558	1210
20	808	1130	920	740	740	4820	1840	1520	975	1090	598	1210
21	805	1120	920	860	710	4600	1790	1480	988	968	617	1130
22	820	1120	940	940	690	4630	1760	1460	868	867	699	1000
23	868	1120	920	1000	680	4380	2150	1450	928	862	721	949
24	898	1130	900	980	660	4110	2990	1440	899	957	748	905
25	928	1150	860	1000	680	4070	3280	1640	867	996	717	855
26	845	1180	840	1000	700	3440	2590	1650	870	930	716	815
27	808	1170	880	980	720	3200	2310	1930	882	923	733	790
28	800	1170	900	980	760	3340	2210	1730	924	895	803	754
29	856	1200	800	1100	---	3630	2260	1560	930	859	782	723
30	823	1150	760	1400	---	5140	2260	1450	899	826	707	701
31	786	---	740	2000	---	5710	---	1390	---	787	785	---
TOTAL	25707	30064	27346	29290	24780	93910	80080	57860	36210	25260	21690	37521
MEAN	829	1002	882	945	885	3029	2669	1866	1207	815	700	1251
MAX	981	1200	1160	2000	2490	6550	4960	2490	1900	1090	1130	2990
MIN	737	781	600	720	640	740	1760	1390	867	584	558	701
AC-FT	50990	59630	54240	58100	49150	186300	158800	114800	71820	50100	43020	74420
CFSM	.11	.13	.11	.12	.11	.39	.34	.24	.16	.10	.09	.16
IN.	.12	.14	.13	.14	.12	.45	.38	.28	.17	.12	.10	.18

CAL YR 1988 TOTAL 767271 MEAN 2096 MAX 7360 MIN 600 AC-FT 1522000 CFSM .27 IN. 3.67
WTR YR 1989 TOTAL 489718 MEAN 1342 MAX 6550 MIN 558 AC-FT 971400 CFSM .17 IN. 2.34

05465500 IOWA RIVER AT WAPELLO, IA
(National stream-quality accounting network station)

LOCATION.--Lat 41°10'48", long 91°10'57", in NW1/4 SE1/4 sec.27, T.74 N., R.3 W., Louisa County, Hydrologic Unit 07080209, on right bank 30 ft downstream from bridge on State Highway 99 at east edge of Wapello, 13.0 mi downstream from Cedar River, and at mile 16.0.

DRAINAGE AREA.--12,499 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1914 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1917, 1923-30, 1932. WSP 1438: Drainage area. WSP 1558: 1918, 1923-25 (M), 1929. WSP 1708: 1955(P), 1956.

GAGE.--Water-stage recorder. Datum of gage is 538.17 ft above NGVD; Oct. 1, 1914 to Apr. 15, 1934, nonrecording gage and Apr. 16, 1934 to Sept. 30, 1972, water-stage recorder at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 8-19, Dec. 25 to Jan. 21, and Feb. 3 to Mar. 13. Records good except those for estimated daily discharges, which are poor. Flow regulated by Coralville Lake (station 05453510) 67.3 mi upstream, since Sept. 17, 1958. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--75 years, 6,964 ft^3/s, 7.57 in/yr, 5,045,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,000 ft^3/s June 18, 1947, gage height, 16.14 ft, datum then in use; maximum gage height, 28.63 ft Apr. 22, 1973; minimum daily discharge, 300 ft^3/s Nov. 28, 1955, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,400 ft^3/s, Sept. 10, gage height, 15.47 ft, minimum daily discharge, 718 ft^3/s Aug. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1160	1010	1300	990	4040	930	6500	2840	1990	1200	942	1380
2	1200	1060	1310	940	4230	900	5620	3180	3830	1120	889	1200
3	1190	1180	1260	920	2500	880	5080	3240	3900	1080	859	1160
4	1140	1060	1130	920	1100	940	4620	3110	3240	1050	870	1100
5	1110	1050	1110	900	960	900	4350	3050	3520	1020	1260	982
6	1080	1160	1170	940	1200	880	4030	3020	2470	1000	1200	1330
7	1060	1100	1080	1100	1400	900	3770	2910	2020	977	939	1770
8	1040	1110	960	1500	1250	1000	3550	2790	1940	962	881	1960
9	1040	1080	780	1600	1100	1200	3410	2670	1880	912	833	5370
10	1020	1100	820	1650	1050	2000	3440	2540	1810	858	794	10700
11	1010	1160	740	1450	1050	2900	3420	2460	1790	850	756	10900
12	1030	1200	780	1200	1200	4000	3280	2340	1880	848	734	9400
13	1020	1200	890	1100	1550	5400	3050	2240	2110	864	721	6370
14	984	1230	1100	1050	1450	6330	3070	2130	2570	842	718	5010
15	994	1220	1000	1000	1350	6850	2890	2030	2400	847	742	3590
16	999	1190	920	1000	1300	7850	2920	1940	1900	857	859	2700
17	1040	1210	900	1050	1250	8470	2760	1900	1670	842	863	2320
18	1020	1460	960	1050	1200	8350	2620	1860	1530	829	748	2110
19	1040	1520	1150	1050	1150	7970	2550	1810	1450	952	736	1950
20	1050	1380	1570	1200	1100	6480	2360	1740	1380	1180	767	1810
21	1040	1330	1570	1500	1050	5870	2240	1690	1320	1320	775	1710
22	1060	1310	1530	1760	1000	5850	2210	1670	1270	1240	803	1580
23	1160	1310	1520	1420	970	5440	2990	1640	1150	1130	877	1480
24	1190	1320	1460	1440	920	5290	4050	1660	1180	1110	959	1420
25	1290	1320	1150	1500	980	5190	4430	1680	1150	1260	992	1360
26	1220	1390	1050	1440	1000	4910	3750	2580	1130	1190	912	1300
27	1090	1380	1000	1400	960	4380	3110	2980	1150	1110	876	1210
28	1030	1350	950	1400	950	4270	2900	2620	1150	1080	932	1140
29	1070	1370	930	1410	---	4380	2800	2170	1260	1050	967	1090
30	1100	1390	990	1730	---	5390	2860	1920	1260	1020	875	1060
31	1040	---	1100	2520	---	6750	---	1800	---	982	973	---
TOTAL	33517	37150	34180	40130	39260	132850	104630	72210	57300	31582	27052	86462
MEAN	1081	1238	1103	1295	1402	4285	3488	2329	1910	1019	873	2882
MAX	1290	1520	1570	2520	4230	8470	6500	3240	3900	1320	1260	10900
MIN	984	1010	740	900	920	880	2210	1640	1130	829	718	982
AC-FT	66480	73680	67800	79600	77870	263500	207500	143200	113700	62640	53660	171500

CAL YR 1988 TOTAL 1217511 MEAN 3327 MAX 11000 MIN 740 AC-FT 2415000
WTR YR 1989 TOTAL 696323 MEAN 1908 MAX 10900 MIN 718 AC-FT 1381000

05465500 IOWA RIVER AT WAPELLO, IA--Continued
(National stream-accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: January 1978 to current year.
WATER TEMPERATURES: January 1978 to current year.
SUSPENDED-SEDIMENT DISCHARGE: April 1978 to current year.

REMARKS.--During periods of ice effect samples are collected in open water channel or through ice cover. Records of specific conductance are obtained from suspended-sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 920 microsiemens Dec. 17, 1988; minimum daily, 250 microsiemens Sept. 18, 1978, July 20, 1982.
WATER TEMPERATURES: Maximum daily, 33.0°C July 25, 1987; minimum daily, 0.0° C on many days during winter period.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,970 mg/L June 25, 1981; minimum daily mean, 1 mg/L Jan. 21, 22, 1981.
SEDIMENT LOADS: Maximum daily, 413,000 tons July 19, 1982; minimum daily, 5.4 tons Jan. 21, 1981.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,350 mg/L June 2; minimum daily mean, 7 mg/L Jan. 22 and Feb. 5-7.
SEDIMENT LOADS: Maximum daily, 25,100 tons June 2; minimum daily, 18 tons Feb. 5.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	560	---	---	728	515	727	---	541	345	---	---	---
2	---	---	---	745	---	646	---	---	345	---	---	555
3	---	---	726	---	---	743	---	---	---	---	---	555
4	580	600	739	---	---	---	473	---	---	---	---	585
5	580	590	---	---	---	---	434	565	530	---	---	585
6	620	---	755	750	---	---	---	---	540	---	535	430
7	---	675	750	773	669	---	444	---	545	585	565	425
8	---	675	710	768	645	---	---	---	---	---	575	---
9	620	605	---	750	---	536	---	500	---	685	670	---
10	600	625	---	---	---	537	---	490	---	700	620	325
11	---	---	---	---	---	585	485	---	---	675	---	330
12	---	---	739	795	732	483	486	---	525	675	---	---
13	---	610	748	785	---	456	476	505	525	---	670	455
14	600	645	780	835	---	442	---	520	545	---	675	---
15	660	---	820	810	---	---	473	515	---	705	655	---
16	---	695	902	---	735	---	479	570	---	715	660	495
17	650	685	920	---	734	---	---	505	---	705	---	520
18	---	675	905	---	720	336	---	500	---	---	---	520
19	---	---	810	777	707	336	---	---	540	---	670	530
20	---	---	807	795	660	---	---	---	560	665	655	530
21	610	---	---	655	659	---	---	565	550	630	660	---
22	630	700	---	---	683	---	---	590	575	630	---	565
23	---	690	780	650	665	---	535	560	---	---	---	---
24	---	690	758	705	617	337	---	---	---	---	---	---
25	600	675	---	706	---	---	531	---	---	---	630	585
26	575	---	---	695	---	---	530	555	---	---	---	585
27	580	---	---	---	---	---	527	500	---	---	585	590
28	590	665	---	---	---	449	---	500	---	---	615	600
29	---	680	752	---	---	455	---	485	---	615	605	590
30	---	688	720	530	---	435	541	---	---	655	---	---
31	---	---	709	535	---	413	---	---	---	640	595	---

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.5	---	---	.5	4.0	.5	---	---	22.0	---	---	---
2	---	---	---	.5	---	.5	---	---	20.0	---	---	23.5
3	---	---	2.5	---	---	.5	---	---	---	---	---	23.0
4	19.0	7.5	2.0	---	---	---	13.0	---	---	---	---	24.0
5	19.0	8.0	---	---	---	---	13.0	14.0	21.5	---	---	25.0
6	16.5	---	3.5	1.0	---	---	---	---	21.5	---	27.0	25.0
7	---	8.5	3.5	.5	1.0	---	14.0	---	22.0	32.0	26.0	25.0
8	---	8.5	2.0	.0	1.0	---	---	---	---	---	22.0	---
9	12.0	8.0	---	.5	---	1.0	---	18.0	---	30.0	27.0	---
10	12.0	7.0	---	---	---	2.0	---	18.0	---	30.0	---	22.0
11	---	---	---	---	---	3.5	13.5	---	---	30.0	---	22.0
12	---	---	1.0	.5	1.0	4.5	13.5	---	23.0	31.0	---	---
13	---	7.0	1.0	.5	---	5.0	13.5	20.0	24.0	---	24.0	18.0
14	12.0	7.0	.5	1.0	---	6.0	---	21.0	24.0	---	25.0	---
15	12.0	---	.5	1.5	---	---	15.5	22.0	---	30.0	20.0	---
16	---	8.0	.5	---	.5	---	16.0	---	---	30.0	26.5	21.0
17	16.0	7.5	.5	---	.5	---	---	23.0	---	30.0	---	22.5
18	---	8.0	.5	---	.5	5.0	---	23.0	---	---	---	23.0
19	11.0	---	1.0	.5	.5	5.5	---	---	29.0	---	70.0	24.0
20	---	---	1.0	.5	.5	---	---	---	28.5	29.0	27.0	24.0
21	11.5	---	---	.5	.5	---	---	23.5	28.0	28.0	27.0	---
22	11.5	6.0	---	---	.5	---	---	23.5	30.0	28.5	---	20.0
23	---	5.5	.5	2.0	.5	---	---	23.5	---	---	---	---
24	---	4.0	.5	2.5	.5	---	---	---	---	---	---	---
25	8.5	4.0	---	3.0	---	---	---	---	---	---	28.0	18.0
26	8.0	---	---	3.0	---	---	---	21.0	---	---	27.0	16.5
27	9.0	---	---	---	---	---	---	23.0	---	---	27.0	16.5
28	8.5	5.0	---	---	---	7.0	---	23.0	---	---	25.0	17.0
29	---	3.0	1.0	---	---	7.5	---	20.0	---	30.0	28.0	20.0
30	---	3.5	.5	3.5	---	7.5	---	---	---	30.0	---	---
31	---	---	.5	3.5	---	8.0	---	---	---	30.0	28.0	---

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	63	197	37	101	28	98	16	43	236	2570	22	55
2	64	207	44	126	10	35	39	99	149	1700	14	34
3	55	177	53	169	10	34	49	122	78	526	14	33
4	37	114	38	109	12	37	48	119	15	45	54	137
5	37	111	37	105	11	33	47	114	7	18	105	255
6	39	114	42	132	14	44	61	155	7	23	158	375
7	36	103	31	92	12	35	48	143	7	26	98	238
8	33	93	24	72	13	34	56	227	47	159	47	127
9	35	98	29	85	13	27	36	156	60	178	14	45
10	31	85	33	98	13	29	30	134	36	102	13	70
11	30	82	40	125	13	26	30	117	23	65	45	352
12	37	103	42	136	14	29	59	191	17	55	56	605
13	41	113	32	104	15	36	60	178	15	63	69	1010
14	35	93	27	90	20	59	17	48	14	55	284	4850
15	67	180	26	86	20	54	13	35	13	47	444	8210
16	63	170	25	80	32	79	12	32	12	42	315	6680
17	56	157	42	137	24	58	11	31	17	57	244	5580
18	50	138	50	197	21	54	10	28	13	42	160	3610
19	45	126	60	246	24	75	11	31	8	25	37	796
20	40	113	46	171	15	64	19	62	11	33	10	175
21	37	104	28	101	13	55	10	40	23	65	9	143
22	38	109	22	78	13	54	7	33	26	70	53	837
23	43	135	20	71	12	49	13	50	20	52	77	1130
24	32	103	28	100	12	47	28	109	28	70	66	943
25	40	139	32	114	13	40	24	97	31	82	82	1150
26	43	142	41	154	13	37	20	78	37	100	140	1860
27	29	85	30	112	13	35	25	94	38	98	125	1480
28	27	75	18	66	13	33	24	91	32	82	108	1250
29	32	92	18	67	13	33	22	84	---	---	84	993
30	48	143	30	113	17	45	25	117	---	---	115	1670
31	40	112	---	---	14	42	188	1380	---	---	160	2920
TOTAL	---	3813	---	3437	---	1410	---	4238	---	6450	---	47613

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY DATA

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	124	2180	207	1590	1690	9130	133	431	84	214	129	481
2	113	1710	225	1930	2350	25100	128	387	78	187	102	330
3	102	1400	195	1710	1230	14100	123	359	72	167	177	554
4	92	1150	137	1150	452	3950	115	326	77	181	98	291
5	99	1160	106	873	538	5110	107	295	124	422	72	191
6	109	1190	113	921	500	3330	102	275	117	379	220	790
7	135	1370	100	786	545	2970	95	251	96	243	364	1740
8	124	1190	85	640	550	2880	82	213	130	309	296	1570
9	100	921	73	526	498	2530	63	155	59	133	288	4180
10	80	743	75	514	428	2090	69	160	76	163	303	8750
11	62	573	79	525	360	1740	82	188	83	169	258	7590
12	63	558	80	505	363	1840	65	149	73	145	192	4870
13	64	527	76	460	403	2300	61	142	58	113	155	2670
14	75	622	95	546	422	2930	60	136	56	109	136	1840
15	75	585	93	510	238	1540	57	130	76	152	124	1200
16	61	481	90	471	230	1180	63	146	57	132	113	824
17	59	440	139	713	190	857	75	171	48	112	100	626
18	55	389	95	477	163	673	68	152	45	91	93	530
19	52	358	75	367	138	540	100	257	35	70	88	463
20	49	312	73	343	106	395	135	430	46	95	88	430
21	45	272	58	265	120	428	122	435	93	195	112	517
22	45	269	42	189	120	411	113	378	70	152	104	444
23	235	1940	50	221	106	329	102	311	94	223	90	360
24	286	3130	60	269	110	350	104	312	146	378	73	280
25	265	3170	82	372	109	338	132	449	161	431	55	202
26	245	2480	953	6640	103	314	120	386	120	295	37	130
27	147	1230	1380	11100	100	310	105	315	76	180	28	91
28	90	705	698	4940	105	326	96	280	53	133	43	132
29	88	665	490	2870	131	446	84	238	86	225	44	129
30	173	1340	343	1780	134	456	56	154	72	170	47	135
31	---	---	250	1210	---	---	83	220	58	152	---	---
TOTAL	---	33060	---	45413	---	88893	---	8231	---	6120	---	42340
YEAR		291018										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT						
25...	1100	8.5	1270	35	120	97
MAR						
23...	1215	6.0	5320	75	1080	88
MAY						
05...	1300	15.0	2920	103	812	97
JUL						
07...	1230	32.0	967	100	261	90
AUG						
29...	1300	28.0	983	100	265	99

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAM-PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)
OCT										
25...	1100	7	1	4	9	47	87	98	100	--
MAR										
23...	1215	6	--	0	2	36	77	97	99	100
MAY										
05...	1300	7	--	0	4	34	66	89	96	100
JUL										
07...	1230	6	1	2	8	58	92	98	100	--
AUG										
29...	1300	5	1	2	8	52	85	96	99	100

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TEMPER-ATURE AIR (DEG C) (00020)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
25...	1100	1270	520	9.30	8.5	7.0	11	13.0	114	746	120	140
DEC												
13...	1445	900	755	8.60	0.5	8.0	5.8	--	--	750	K4	K30
MAR												
23...	1215	5320	346	7.80	6.0	7.0	12	12.2	99	752	100	450
MAY												
05...	1300	2920	485	9.30	15.0	9.0	25	14.6	149	740	K85	170
JUL												
07...	1230	967	400	9.20	32.0	29.0	27	12.0	167	753	K30	K28
AUG												
29...	1300	983	568	9.20	28.0	21.0	25	15.3	199	751	100	96

DATE	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
OCT												
25...	49	200	43	23	39	29	1	6.0	154	22	143	58
DEC												
13...	54	300	75	27	41	23	1	5.8	244	6	285	64
MAR												
23...	40	140	38	10	12	15	0.5	7.9	116	0	141	30
MAY												
05...	58	200	46	20	26	22	0.8	5.0	134	16	131	53
JUL												
07...	45	180	39	21	39	31	1	6.1	130	19	121	55
AUG												
29...	190	190	45	19	48	35	2	5.4	150	32	118	48

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT												
25...	57	0.30	0.13	334	322	0.45	1150	--	0.570	0.020	<0.010	<0.010
DEC												
13...	60	0.30	4.6	442	437	0.60	1070	1.8	2.40	0.040	0.600	0.580
MAR												
23...	19	0.20	8.6	213	199	0.29	3060	0.80	2.80	0.070	1.60	1.60
MAY												
05...	43	0.30	0.11	296	282	0.40	2330	0.88	0.970	0.041	0.010	0.021
JUL												
07...	62	0.20	1.2	312	307	0.42	815	3.0	<0.100	<0.010	0.040	0.020
AUG												
29...	61	0.30	2.5	328	231	0.45	871	--	0.200	0.030	<0.010	<0.010

K Results based on colony count outside ideal range.

05465500 IOWA RIVER AT WAPELLO, IA--Continued

WATER QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P) (00671)	PHOSPHOROUS DISSOLVED (MG/L AS P) (00666)	PHOSPHOROUS TOTAL (MG/L AS P) (00665)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)
OCT												
25...	0.60	0.160	0.200	0.380	35	120	97	2	<10	76	<0.5	1
DEC												
13...	2.4	0.270	0.320	0.430	--	--	--	--	--	--	--	--
MAR												
23...	2.4	0.290	0.360	0.580	75	1080	88	2	60	160	<0.5	<1
MAY												
05...	0.90	0.041	0.070	0.171	103	812	97	2	10	83	<0.5	<1
JUL												
07...	3.0	0.110	0.170	0.280	100	261	90	--	--	--	--	--
AUG												
29...	3.1	0.230	0.290	0.410	100	265	99	4	10	100	<0.5	<1

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)
OCT											
25...	<1	<3	6	41	<5	9	9	<0.1	<10	5	<1
DEC											
13...	--	--	--	--	--	--	--	--	--	--	--
MAR											
23...	<1	<3	4	110	<5	<4	31	<0.1	<10	5	<1
MAY											
05...	<1	<3	1	18	<5	9	5	<0.1	<10	2	<1
JUL											
07...	--	--	--	--	--	--	--	--	--	--	--
AUG											
29...	<1	<3	3	12	<5	8	3	<0.1	<10	2	<1

[Pesticide concentration expressed as total recoverable]

DATE	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	ATRAZINE, TOTAL (UG/L) (39630)	CYANAZINE TOTAL (UG/L) (81757)	METRIBUZIN IN WHOLE WATER (UG/L) (81408)	ALACHLOR TOTAL RECOVER (UG/L) (77825)	METOLACHLOR IN WHOLE WATER (UG/L) (39356)	TRIFLURALIN TOTAL RECOVER (UG/L) (39030)	BUTYLATE (UG/L) (99901)
OCT											
25...	<1.0	170	<6	24	--	--	--	--	--	--	--
DEC											
13...	--	--	--	--	--	--	--	--	--	--	--
MAR											
23...	<1.0	93	<6	39	0.71	0.20	0.44	<0.10	<0.10	<0.10	<0.10
MAY											
05...	<1.0	150	<6	7	0.97	0.86	0.56	0.15	<0.10	<0.10	<0.10
JUL											
07...	--	--	--	--	1.1	0.46	0.27	<0.10	<0.10	<0.10	<0.10
AUG											
29...	<1.0	170	<6	4	--	--	--	--	--	--	--

05470000 SOUTH SKUNK RIVER NEAR AMES, IA

LOCATION.--Lat 42°04'05", long 93°37'02", in NW1/4 SW1/4 sec.23, T.84 N., R.24 W., Story County, Hydrologic Unit 07080105, on left bank 2.5 mi north of Ames, 3.5 mi downstream from Keigley Branch, 5.2 mi upstream from Squaw Creek, and at mile 228.1 upstream from mouth of Skunk River.

DRAINAGE AREA.--315 mi^2.

PERIOD OF RECORD.--July 1920 to September 1927, October 1932 to current year. Monthly discharge only for some periods, published in WSP 1308. Prior to October 1966, published as Skunk River near Ames.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1921, 1925-26, 1934-35 (M), 1937 (M), 1939 (M), 1947-50 (M). WDR Iowa 1967: 1965. WDR IA-74-1: 1973 (P).

GAGE.--Water-stage recorder. Concrete control since July 21, 1934. Datum of gage is 893.61 ft above NGVD (Iowa Highway Commission benchmark). Prior to Aug. 25, 1921, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Jan. 2-10, Feb. 3 to Mar. 23, and July 9. Records good except those for Oct. 1 to Nov. 3 which are fair and estimated periods which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--64 years (water years 1921-27, 1933-89), 161 ft^3/s, 6.94 in/yr, 116,600 acre-ft/yr; median of yearly mean discharges, 120 ft^3/s, 5.2 in/yr, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,630 ft^3/s June 10, 1954, gage height, 13.66 ft; maximum gage height, 13.90 ft May 20, 1944; no flow at times in 1934, 1937, 1953-57, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	0830	*370	(a) *4.98				

(a) Ice jam

Minimum discharge, 0.37 ft^3/s Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	1.6	2.5	1.0	5.1	4.2	23	21	16	40	5.3	.76
2	1.6	2.5	2.5	1.0	14	3.7	20	18	15	32	4.5	.71
3	2.4	2.8	2.9	1.2	10	3.9	18	16	316	25	3.3	.57
4	2.6	2.4	2.6	1.4	9.4	4.1	16	15	503	20	3.0	1.9
5	2.8	2.4	2.7	1.6	9.0	4.2	15	16	297	16	2.9	3.3
6	3.0	2.6	2.9	25	8.4	4.0	14	15	175	13	2.4	3.3
7	3.0	2.2	3.2	35	8.0	3.9	14	14	105	11	2.1	2.9
8	4.5	2.4	2.9	19	7.8	3.8	17	13	86	10	1.4	4.8
9	5.7	2.4	2.6	12	7.6	75	17	11	194	8.5	1.1	18
10	6.3	3.0	2.4	9.0	7.0	200	16	11	118	7.6	.88	30
11	8.7	2.6	2.1	17	7.0	150	16	9.8	78	7.3	.94	37
12	7.5	4.5	1.9	13	7.4	115	15	8.6	61	7.4	.98	27
13	8.7	5.2	1.8	7.3	7.8	90	14	8.5	52	8.2	1.0	18
14	4.2	3.5	1.9	6.0	7.2	70	13	8.1	49	7.9	1.1	13
15	3.3	4.9	1.8	5.3	7.0	48	12	7.2	37	7.8	1.1	10
16	3.9	9.9	1.6	4.6	7.0	40	12	6.4	30	7.9	1.1	7.5
17	4.0	6.2	1.5	4.3	7.0	25	12	5.7	24	8.1	1.0	5.8
18	3.7	6.9	1.4	4.2	6.6	22	12	6.5	21	8.7	.62	4.5
19	2.2	5.0	1.5	4.5	6.4	24	10	8.4	18	9.0	.98	3.9
20	.96	4.4	1.7	5.0	6.8	23	9.0	8.2	16	9.2	1.7	3.7
21	1.2	4.2	1.6	6.0	6.4	22	8.4	7.8	13	9.6	1.6	3.0
22	2.6	4.3	1.7	5.9	6.0	23	10	6.9	12	10	.99	2.5
23	2.6	3.9	1.9	5.6	5.6	29	14	6.6	11	10	.79	1.6
24	1.6	4.1	2.1	5.5	5.0	37	39	107	11	10	1.5	2.1
25	.91	4.0	2.1	5.3	4.5	52	25	80	17	8.9	1.9	1.7
26	2.4	4.1	2.2	5.0	4.3	70	18	85	28	7.0	2.6	2.7
27	2.9	3.5	2.2	4.8	4.2	72	14	53	136	6.1	2.7	1.9
28	2.6	3.1	1.8	4.5	4.5	61	25	34	133	5.9	2.5	.90
29	3.1	2.7	1.5	4.4	---	44	21	27	85	5.4	2.1	1.1
30	.84	2.8	1.3	4.4	---	33	22	21	56	7.1	1.6	1.7
31	2.8	---	1.1	4.7	---	27	---	17	---	6.2	.92	---
TOTAL	103.91	114.1	63.9	233.5	197.0	1383.8	491.4	672.7	2713	350.8	56.60	215.84
MEAN	3.35	3.80	2.06	7.53	7.04	44.6	16.4	21.7	90.4	11.3	1.83	7.19
MAX	8.7	9.9	3.2	35	14	200	39	107	503	40	5.3	37
MIN	.84	1.6	1.1	1.0	4.2	3.7	8.4	5.7	11	5.4	.62	.57
AC-FT	206	226	127	463	391	2740	975	1330	5380	696	112	428
CFSM	.01	.01	.01	.02	.02	.14	.05	.07	.29	.04	.01	.02
IN.	.01	.01	.01	.03	.02	.16	.06	.08	.32	.04	.01	.03

CAL YR 1988 TOTAL 18532.52 MEAN 50.6 MAX 468 MIN .04 AC-FT 36760 CFSM .16 IN. 2.19
WTR YR 1989 TOTAL 6596.55 MEAN 18.1 MAX 503 MIN .57 AC-FT 13080 CFSM .06 IN. .78

05470500 SQUAW CREEK AT AMES, IA

LOCATION.--Lat 42°01'21", long 93°37'45", in NE1/4 NW1/4 sec.10, T.83 N., R.24 W., Story County, Hydrological Unit 07080105, on left bank 65 ft downstream from Lincoln Way Bridge in Ames, 0.2 mi, downstream from College Creek, and 2.4 mi, upstream from mouth.

DRAINAGE AREA.--204 mi^2.

PERIOD OF RECORD.--May 1919 to September 1927, May 1965 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: Drainage area, 1920-22 (M), 1923, 1924-25 (M), 1926, 1927 (M), WDR Iowa. 1966: 1965, WDR IA-71-1: 1970 (M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 881.00 ft above NGVD (levels by Iowa State University). Prior to Mar. 11, 1925, nonrecording gage at site 0.6 mi upstream at different datum. Mar. 11, 1925 to Apr. 30, 1927, nonrecording gage at site 65 ft upstream at datum about 4 ft higher.

REMARKS.-- Estimated daily discharges: Dec. 26, 27, 29-31, Jan. 1, 2, 4, Mar. 29, Apr. 1-4. Records good except those for estimated daily discharges which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--32 years (water years 1920-27,1966-89), 127 ft^3/s, 8.45 in/yr, 92,012 acre-ft/yr; median of yearly mean discharges, 98 ft^3/s, 6.5 in/yr, 71,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft^3/s June 27, 1975, gage height, 14.00 ft, on basis of contracted-opening measurement; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 4, 1918, reached a stage of 14.5 ft, from floodmarks, site and datum used 1919-25, discharge, 6,900 ft^3/s. Flood of Mar. 1, 1965, reached a stage of 10.7 ft, from graph based on gage readings, at present site and datum, discharge, 4,200 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 24	1030	*2,050	*7.01	No other peak greater than base discharge.			

No flow part of each day Oct. 1, 2, 5-9, 13-15 and Aug. 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.06	.80	.43	.45	58	5.8	13	14	44	48	1.4	.35
2	.17	.26	.52	.48	31	3.8	11	9.7	36	38	1.1	.35
3	.34	.27	.57	.54	38	8.4	11	8.1	56	30	2.2	.35
4	.25	.16	.55	.87	28	12	10	12	113	24	.83	17
5	.11	.24	.80	6.4	25	8.5	9.2	10	83	19	3.6	.62
6	.17	.24	1.1	29	16	7.7	9.6	7.9	58	15	.58	.48
7	.21	.20	1.3	36	12	9.9	13	7.0	45	12	.56	5.1
8	.06	.19	1.2	2.4	7.8	20	14	7.0	77	9.3	.53	15
9	.26	.18	1.3	1.7	7.6	283	9.7	8.2	109	7.4	.42	19
10	.66	.21	1.3	.75	6.6	566	7.9	8.3	70	6.0	.32	9.1
11	.63	.14	.69	.46	7.1	249	7.3	9.8	51	4.8	.24	5.9
12	.35	4.1	.61	.33	7.5	122	7.2	7.1	44	39	.20	2.7
13	.14	.51	.75	.31	6.3	83	7.2	7.0	35	54	.21	2.0
14	.06	.47	1.0	.33	5.8	74	5.8	6.5	28	35	.25	1.2
15	.14	12	.91	.38	6.3	31	5.0	5.4	24	24	.27	.85
16	.16	4.0	.69	.44	6.6	35	5.0	.90	21	18	.20	.64
17	.42	1.4	.38	.71	8.3	5.2	5.3	.74	19	13	.02	.53
18	.54	1.7	.63	.80	6.5	20	5.7	5.6	18	56	.07	.50
19	.32	.96	.52	1.9	5.0	14	4.6	3.7	16	25	6.4	.47
20	.35	.56	.83	2.8	6.0	11	3.8	3.5	13	19	.42	.34
21	.56	.40	.48	8.8	5.7	11	4.8	6.4	11	16	.28	.37
22	.65	.43	.55	9.9	7.4	12	16	3.3	11	12	.25	.40
23	.64	.53	.89	11	5.9	7.2	9.9	1.8	13	8.2	1.5	.50
24	.41	.56	1.4	8.9	6.3	8.1	12	1350	14	6.5	.26	.47
25	.38	.56	5.5	10	6.5	6.5	11	685	53	5.9	.22	.42
26	.51	3.1	.90	7.8	6.4	6.0	9.9	301	138	5.2	5.5	.36
27	.49	.68	.60	9.0	6.3	6.5	14	161	242	4.3	.39	.25
28	.54	.46	.51	14	5.9	5.2	37	110	125	2.9	.39	.34
29	.52	.61	.45	94	---	7.0	20	86	82	4.8	.32	.43
30	.51	.50	.45	129	---	15	14	67	59	2.6	.23	.33
31	.51	---	.48	90	---	16	---	53	---	2.2	.25	---
TOTAL	11.12	36.42	28.29	479.45	345.8	1669.8	313.9	2966.94	1708	567.1	29.41	86.35
MEAN	.36	1.21	.91	15.5	12.3	53.9	10.5	95.7	56.9	18.3	.95	2.88
MAX	.66	12	5.5	129	58	566	37	1350	242	56	6.4	19
MIN	.06	.14	.38	.31	5.0	3.8	3.8	.74	11	2.2	.02	.25
AC-FT	22	72	56	951	686	3310	623	5880	3390	1120	58	171
CFSM	.00	.01	.00	.08	.06	.26	.05	.47	.28	.09	.00	.01
IN.	.00	.01	.01	.09	.06	.30	.06	.54	.31	.10	.01	.02

CAL YR 1988 TOTAL 11706.50 MEAN 32.0 MAX 432 MIN .00 AC-FT 23220 CFSM .16 IN. 2.13
WTR YR 1989 TOTAL 8242.58 MEAN 22.6 MAX 1350 MIN .02 AC-FT 16350 CFSM .11 IN. 1.50

05471050 SOUTH SKUNK RIVER AT COLFAX, IA

LOCATION.--Lat 41°40'55", long 93°14'47", in NE1/4 NE1/4 SW1/4 sec.1, T.79 N., R.21 W., Jasper County, Hydrologic Unit 07080105, on left bank 15 ft downstream of bridge on State Highway 117 at north edge of Colfax, 1 mi downstream from Sugar Creek, 2.8 mi upstream from Indian Creek, and at mile 191 upstream from mouth of Skunk River.

WATER-DISCHARGE RECORDS

DRAINAGE AREA.--803 mi^2.

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 770.00 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 9 to Mar. 10, and Mar. 18-22. Records good except those for estimated daily discharges, which are poor. U.S. National Weather Service Limited Automatic Remote Collector at station.

EXTREMES FOR PERIOD OF RECORD.-- Maximum discharge, 6,850 ft^3/s Aug. 27, 1987, gage height, 17.35 ft; minimum discharge, 1.2 ft^3/s Aug. 18, 19, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood occurred in late June, 1975, discharge and gage height not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	1015	Ice jam	*12.85	May 25	0045	*2,180	11.98

Minimum discharge, 6.4 ft^3/s Dec. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	17	13	8.4	100	12	75	93	160	165	34	31
2	9.8	17	15	7.2	56	13	72	83	143	135	32	25
3	8.3	18	19	6.6	30	13	66	74	195	115	31	24
4	8.2	21	16	7.0	25	13	61	69	205	91	32	27
5	8.5	21	17	10	24	12	57	63	560	75	33	30
6	9.0	16	18	11	23	13	54	57	415	65	31	31
7	9.5	14	17	10	23	14	52	52	290	59	27	70
8	9.8	13	12	9.0	21	20	55	46	227	52	25	123
9	10	14	10	8.5	20	100	56	43	205	45	24	234
10	10	14	9.0	8.0	20	500	51	38	290	42	23	167
11	9.2	13	10	8.5	19	1220	48	36	242	45	22	110
12	8.9	19	12	9.0	18	755	47	33	196	50	21	95
13	9.7	18	14	8.6	18	417	46	32	168	43	22	86
14	10	16	13	8.2	17	271	44	29	148	89	23	77
15	11	20	12	7.8	17	196	42	27	137	96	24	66
16	11	33	12	7.4	16	155	41	25	123	76	21	57
17	12	24	11	7.2	16	133	39	23	111	63	20	52
18	12	22	11	7.0	16	80	37	25	102	144	18	45
19	12	18	10	7.4	15	86	35	27	95	175	20	40
20	13	16	10	7.8	15	90	34	23	86	102	24	36
21	15	12	10	8.4	14	92	35	21	81	81	19	34
22	16	13	11	9.0	14	94	34	21	74	81	21	32
23	16	18	12	8.4	12	93	36	20	71	73	34	29
24	14	18	13	7.8	12	93	41	654	68	65	45	29
25	14	16	12	7.2	13	97	43	1650	79	57	28	29
26	14	24	11	7.0	13	102	66	815	115	51	46	28
27	15	19	12	10	12	115	101	527	116	47	30	26
28	15	11	12	20	12	120	241	350	291	42	29	25
29	14	14	11	30	---	113	153	273	284	40	51	26
30	15	15	10	40	---	98	102	239	216	41	34	25
31	17	---	9.0	70	---	83	---	186	---	38	31	---
TOTAL	367.9	524	384.0	382.4	611	5213	1864	5654	5493	2343	875	1709
MEAN	11.9	17.5	12.4	12.3	21.8	168	62.1	182	183	75.6	28.2	57.0
MAX	17	33	19	70	100	1220	241	1650	560	175	51	234
MIN	8.2	11	9.0	6.6	12	12	34	20	68	38	18	24
AC-FT	730	1040	762	758	1210	10340	3700	11210	10900	4650	1740	3390
CFSM	.01	.02	.02	.02	.03	.21	.08	.23	.23	.09	.04	.07
IN.	.02	.02	.02	.02	.03	.24	.09	.26	.25	.11	.04	.08

CAL YR 1988 TOTAL 48473.0 MEAN 132 MAX 700 MIN 1.4 AC-FT 96150 CFSM .16 IN. 2.25
WTR YR 1989 TOTAL 25420.3 MEAN 69.6 MAX 1650 MIN 6.6 AC-FT 50420 CFSM .09 IN. 1.18

05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1988 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1988 to September 1989.
WATER TEMPERATURES: October 1988 to September 1989.
SUSPENDED-SEDIMENT DISCHARGE: October 1988 to September 1989.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. Miscellaneous records of specific conductance, water temperature, and suspended-sediment discharge from May 13 to September 30, 1988 on file at the District Office in Iowa City.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 790 microsiemens Feb. 18,1989; minimum daily, 255 microsiemens Mar. 11, 1989.
WATER TEMPERATURES: Maximum daily, 31.0°C July 7, 1989; minimum daily, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,250 mg/L May 25, 1989; minimum daily mean, 3 mg/L Apr. 12, 1989.
SEDIMENT LOADS: Maximum daily, 10,100 tons May 25, 1989; minimum daily, 0.05 ton Jan. 7, 8, 1989.

EXTREMES FOR CURRENT YEAR.--
SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,250 mg/L May 25; minimum daily mean, 3 mg/L Apr. 12, 1989.
SEDIMENT LOADS: Maximum daily, 10,100 tons May 25; minimum daily, 0 .05 ton Jan. 7, 8.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	---	655
2	---	---	---	---	---	---	---	---	---	695	---	700
3	---	---	---	---	---	---	---	725	---	---	---	680
4	640	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	705	---	650
6	---	---	---	---	---	---	---	---	---	---	---	520
7	---	---	---	---	---	---	716	---	---	715	---	535
8	---	---	---	---	---	---	---	---	675	---	---	486
9	---	---	---	---	---	---	---	---	---	---	---	670
10	---	---	---	---	---	315	695	---	---	---	---	---
11	---	---	---	---	---	255	750	---	---	---	---	---
12	---	---	---	---	---	---	745	---	700	585	---	745
13	---	---	---	680	---	340	755	---	---	---	---	745
14	---	640	---	---	---	455	---	---	---	---	---	---
15	---	---	---	---	730	465	750	---	---	---	---	---
16	---	---	---	---	---	450	---	---	770	---	---	---
17	---	---	---	---	---	435	---	---	---	720	---	---
18	---	---	---	---	790	---	750	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	420	---	---
20	---	---	---	---	---	---	---	---	---	490	---	---
21	---	---	---	---	600	---	---	---	---	---	---	---
22	---	---	730	---	---	375	755	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	295	---	---	---	---
25	---	---	---	---	---	---	725	365	---	---	---	---
26	---	---	---	---	---	---	---	---	640	---	---	---
27	---	---	---	---	---	---	665	---	---	---	---	---
28	---	---	---	---	---	---	415	---	---	---	---	---
29	---	---	---	---	---	---	---	---	685	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	684	---

05471050 SOUTH SKUNK RIVER AT COLFAX, IA-CONTINUED

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	1.0	---	---	---	---	---	30.0
2	---	---	---	---	---	---	---	---	---	---	---	28.0
3	---	---	---	---	---	---	---	11.0	---	---	---	22.0
4	11.5	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	30.0	---	27.0
6	---	---	---	---	---	---	---	---	---	---	---	30.0
7	---	---	---	---	---	---	---	---	---	31.0	---	22.0
8	---	---	---	---	---	---	---	---	---	---	---	21.0
9	---	---	---	---	---	---	---	---	---	---	---	23.0
10	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	24.0	24.0	---	15.0
13	---	---	---	.0	---	---	---	---	---	---	---	18.0
14	---	8.0	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	15.5	---	---	---
17	---	---	---	---	---	---	---	---	---	25.0	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	21.0	---	---
20	---	---	---	---	---	---	---	---	---	20.0	---	---
21	---	---	.5	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	14.0	---	---	---	---	---
23	---	---	---	---	---	---	21.0	---	---	---	30.0	---
24	---	---	---	---	---	---	---	19.5	---	---	---	---
25	---	---	---	---	---	---	---	20.0	---	---	---	---
26	---	---	---	---	---	---	---	---	25.0	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	17.0	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---

SUSPENDED-SEDIMENT WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	--	.24	--	.41	--	.49	--	.11	--	4.6	20	.65
2	--	.21	--	.37	--	.45	--	.10	--	2.0	19	.67
3	--	.18	--	.34	--	.41	--	.09	--	.81	19	.67
4	--	.13	--	.74	--	.65	--	.08	--	.67	18	.63
5	--	.18	--	1.1	--	.46	--	.08	--	.60	16	.52
6	--	.41	--	.56	--	.49	--	.09	--	.40	15	.53
7	--	.46	--	.42	--	.32	--	.05	--	.31	15	.57
8	--	.42	--	.35	--	.16	--	.05	--	.28	89	4.8
9	--	.54	--	.34	--	.16	--	.11	--	.27	262	71
10	--	.51	--	.30	--	.12	--	.28	--	.27	402	543
11	--	.37	--	.25	--	.13	--	.73	--	.23	363	1200
12	--	.29	--	.92	--	.16	--	1.1	--	.24	239	487
13	--	.50	--	.83	--	.15	--	.51	--	1.1	100	113
14	--	.62	--	.43	--	.18	--	.35	--	1.1	63	46
15	--	.68	--	1.1	--	.23	--	.32	12	.62	53	28
16	--	.65	--	3.8	--	.16	--	.24	10	.49	50	21
17	--	.68	--	1.9	--	.15	--	.21	10	.46	19	6.8
18	--	.52	--	2.1	--	.12	--	.19	7	.30	18	3.9
19	--	.49	--	1.1	--	.08	--	.18	15	.61	17	3.9
20	--	.56	--	.78	--	.08	--	.17	25	1.0	15	3.6
21	--	.69	--	.49	--	.76	--	.57	58	2.2	12	3.0
22	--	.95	--	.42	--	1.0	--	.68	75	2.8	25	6.3
23	--	1.7	--	1.2	--	.68	--	.50	65	2.1	38	9.5
24	--	.98	--	1.4	--	.35	--	.38	57	2.0	25	6.3
25	--	.76	--	.69	--	.65	--	.25	49	2.0	8	2.1
26	--	.76	--	1.8	--	.50	--	.21	40	1.5	15	4.1
27	--	.69	--	1.4	--	.45	--	.51	31	1.1	19	5.9
28	--	.61	--	.68	--	.42	--	2.3	26	.84	17	5.5
29	--	.38	--	.60	--	.30	--	9.1	---	---	12	3.7
30	--	.40	--	.57	--	.22	--	6.0	---	---	9	2.4
31	--	.46	---	---	--	.17	--	5.7	---	---	8	1.8
TOTAL	---	17.02	---	27.39	---	10.65	---	31.24	---	30.90	---	2586.84

05471050 SOUTH SKUNK RIVER AT COLFAX, IA--Continued

WATER-QUALITY RECORDS

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	7	1.4	170	43	43	19	50	22	19	1.7	17	1.4
2	7	1.4	65	15	42	16	41	15	14	1.2	15	1.0
3	6	1.1	43	8.6	110	58	38	12	13	1.1	18	1.2
4	6	.99	36	6.7	135	75	34	8.4	16	1.4	21	1.5
5	4	.62	30	5.1	320	496	30	6.1	23	2.0	18	1.5
6	4	.58	26	4.0	275	308	23	4.0	23	1.9	20	1.7
7	7	.98	24	3.4	229	179	16	2.5	20	1.5	107	20
8	23	3.4	20	2.5	193	118	15	2.1	17	1.1	179	59
9	32	4.8	18	2.1	168	93	13	1.6	13	.84	172	109
10	23	3.2	17	1.7	208	163	13	1.5	9	.56	70	32
11	5	.65	16	1.6	170	111	20	2.4	7	.42	44	13
12	3	.38	15	1.3	123	65	38	5.1	6	.34	21	5.4
13	11	1.4	13	1.1	90	41	31	3.6	6	.36	21	4.9
14	13	1.5	12	.94	63	25	54	13	6	.37	21	4.4
15	10	1.1	10	.73	42	16	58	15	24	1.6	20	3.6
16	9	1.0	10	.67	35	12	19	3.9	17	.96	17	2.6
17	8	.84	10	.62	34	10	11	1.9	12	.65	15	2.1
18	11	1.1	7	.47	31	8.5	151	89	9	.44	14	1.7
19	10	.94	6	.44	30	7.7	423	206	13	.70	13	1.4
20	10	.92	5	.31	27	6.3	72	21	24	1.6	12	1.2
21	10	.94	5	.28	24	5.2	26	5.7	19	.97	10	.92
22	19	1.7	5	.28	21	4.2	38	8.3	18	1.0	9	.78
23	30	2.9	5	.27	19	3.6	33	6.5	39	3.6	8	.63
24	44	4.9	2110	5390	16	2.9	28	4.9	78	9.5	8	.63
25	30	3.5	2250	10100	15	3.2	26	4.0	32	2.4	22	1.7
26	116	19	790	1760	80	29	25	3.4	49	6.1	17	1.3
27	276	85	289	414	85	27	22	2.8	32	2.6	14	.98
28	2240	1620	170	161	182	143	19	2.2	28	2.2	20	1.3
29	1550	640	98	72	113	87	23	2.5	58	8.0	24	1.7
30	620	171	79	51	73	43	25	2.8	56	5.1	19	1.3
31	---	---	50	25	---	---	20	2.1	45	3.8	---	---
TOTAL	---	2577.24	---	18074.11	---	2175.6	---	481.3	---	66.01	---	279.84
YEAR		26358.14										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	TEMPERATURE WATER (DEG C) (00010)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 16...	1350	5.0	153	28	12	--	--	--	--	61
APR 27...	1015	12.5	86	294	68	64	75	79	84	99
JUN 08...	1240	22.0	230	191	119	--	--	--	--	98
JUL 20...	0930	20.0	103	42	12	--	--	--	--	96
AUG 31...	1510	29.5	30	29	2.3	--	--	--	--	98

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAMPLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)
MAR 16...	1320	5	1	2	17	80	96	98	99	99	100	--
APR 27...	0952	5	1	1	15	79	90	93	94	97	100	--
JUN 08...	1225	5	--	0	28	79	94	98	99	100	--	--
JUL 20...	0925	1	0	1	13	78	94	96	97	98	100	--
AUG 31...	1310	5	1	2	16	74	91	93	94	94	96	100

05471200 INDIAN CREEK NEAR MINGO, IA

LOCATION.--Lat 41°48'17", long 93°18'36", in NW1/4 NW1/4 secs. 28, T.81 N., R.21 W., Hydrologic Unit 07080105, Jasper County, on right bank 30 ft downstream from bridge on State Highway 117, 0.7 mi downstream from Wolf Creek, 2.2 mi upstream from Byers Branch, 2.9 mi northwest of Mingo, and 11.3 mi upstream from S. Skunk River.

DRAINAGE AREA.--276 mi^2.

PERIOD OF RECORD.--May 1958 to September 1975; October 1985 to current year.

REVISED RECORDS.--WSP 1728: 1958 (M), 1959 (M).

GAGE.--Water-stage recorder. Datum of gage is 810.47 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 9 to Mar. 9, 18-24. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--21 years (water years 1959-75, 1986-89) 181 ft^3/s, 8.91 in/yr, 131,100 acre-ft/yr; median of yearly mean discharges, 160 ft^3/s, 7.9 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,380 ft^3/s June 12, 1966, gage height, 16.41 ft; no flow part of each day Aug. 13, 16-19, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 20, 1944, reached a stage of 21.4 ft, from information by local resident, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 24	1015	*1,010	*8.13				

No flow part of each day Aug. 13, 16-19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.82	1.7	5.6	1.5	19	2.8	8.7	17	15	2.5	.80	2.0
2	.91	3.0	5.6	1.4	15	2.9	8.5	12	12	2.3	.47	.64
3	.86	3.0	4.6	1.3	12	2.8	8.0	10	85	1.5	1.0	.52
4	.87	1.8	4.7	1.4	9.0	2.9	7.1	10	28	1.5	1.5	1.4
5	.92	1.9	4.6	2.0	6.6	3.0	6.5	9.0	18	1.1	1.8	.82
6	1.1	1.5	4.4	3.0	5.6	3.1	5.9	8.1	14	1.1	1.1	2.4
7	1.2	1.1	4.2	2.5	4.9	3.2	5.6	7.6	12	1.1	.19	8.7
8	1.4	1.8	4.6	2.2	4.3	10	8.7	7.7	12	.97	.15	13
9	1.4	2.0	4.0	2.0	4.1	100	9.7	7.4	11	1.2	.14	71
10	1.3	1.6	3.0	1.9	3.8	529	8.4	6.8	9.3	.97	.10	51
11	.95	2.5	3.3	2.1	4.1	241	7.5	6.5	8.0	2.9	1.2	29
12	1.1	5.8	3.0	2.1	4.4	114	6.6	6.5	8.0	1.9	.27	17
13	1.3	6.5	2.7	2.0	4.2	61	6.0	6.9	6.7	1.2	.16	12
14	1.2	5.9	2.5	2.0	4.0	46	5.8	7.2	5.2	.81	.45	7.9
15	1.2	7.2	2.3	1.9	3.9	31	5.2	7.5	4.3	1.2	.30	6.4
16	1.6	12	2.2	1.9	3.8	29	5.6	8.4	3.9	1.0	.11	5.1
17	2.0	14	2.1	1.8	3.7	21	5.1	8.8	3.6	.68	.05	4.6
18	1.8	8.7	1.9	1.8	3.6	19	5.3	13	3.6	91	.01	3.2
19	1.8	5.8	1.8	1.9	3.5	18	4.9	14	3.4	41	.24	2.8
20	2.3	4.2	1.7	2.1	3.4	17	4.9	16	3.5	17	.46	2.5
21	2.6	3.9	1.7	2.3	3.3	16	4.4	11	3.0	10	.09	2.2
22	1.8	4.3	1.6	2.5	3.2	17	9.7	11	2.8	6.6	.06	1.9
23	2.2	4.1	1.5	2.4	3.1	17	6.6	11	2.6	4.9	3.0	1.0
24	1.9	4.1	1.8	2.3	2.8	18	5.5	556	2.6	3.6	7.0	1.3
25	2.0	3.5	1.6	2.2	3.0	18	4.9	259	7.5	3.0	1.2	1.2
26	1.4	5.6	1.7	2.1	2.9	19	5.1	97	13	2.6	26	.95
27	1.7	4.6	1.8	2.5	2.9	17	5.8	52	13	2.0	11	.95
28	1.3	6.1	1.9	5.0	2.8	15	13	33	7.8	1.4	5.7	.97
29	1.4	6.2	1.8	8.0	---	12	29	27	4.5	1.9	6.3	1.1
30	1.6	5.3	1.7	15	---	11	24	23	3.1	1.7	2.3	1.0
31	2.0	---	1.6	25	---	9.2	---	18	---	1.2	2.5	---
TOTAL	45.93	139.7	87.5	108.1	146.9	1425.9	242.0	1288.4	326.4	211.83	75.65	254.55
MEAN	1.48	4.66	2.82	3.49	5.25	46.0	8.07	41.6	10.9	6.83	2.44	8.48
MAX	2.6	14	5.6	25	19	529	29	556	85	91	26	71
MIN	.82	1.1	1.5	1.3	2.8	2.8	4.4	6.5	2.6	.68	.01	.52
AC-FT	91	277	174	214	291	2830	480	2560	647	420	150	505
CFSM	.01	.02	.01	.01	.02	.17	.03	.15	.04	.02	.01	.03
IN.	.01	.02	.01	.01	.02	.19	.03	.17	.04	.03	.01	.03

CAL YR 1988 TOTAL 15897.70 MEAN 43.4 MAX 350 MIN .22 AC-FT 31530 CFSM .16 IN. 2.14
WTR YR 1989 TOTAL 4352.86 MEAN 11.9 MAX 556 MIN .01 AC-FT 8630 CFSM .04 IN. .59

05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IA

LOCATION.--Lat 41°21'19", long 92°39'31", in NW1/4 SW1/4 sec.25, T.76 N., R.16 W., Mahaska County, Hydrologic Unit 07080105, on right bank 400 ft upstream from bridge on U.S. Highway 63, 0.3 mi downstream from Painter Creek, 4.0 mi north of Oskaloosa, 52.0 mi upstream from confluence with North Skunk River, and at mile 147.3 upstream from mouth of Skunk River.

DRAINAGE AREA.--1,635 mi^2.

PERIOD OF RECORD.--October 1945 to current year. Prior to October 1966, published as Skunk River near Oskaloosa. Prior to October 1948, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 685.50 ft above NGVD. Prior to Nov. 21, 1947, nonrecording gage at site 400 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 7 to Mar. 12 and Mar 21, 22. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--44 years, 947 ft^3/s, 7.87 in/yr, 686,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft^3/s June 15, 1947, gage height, 21.26 ft, from floodmarks; maximum gage height, 22.52 ft Feb. 3, 1973, backwater from ice; minimum daily discharge, 1.8 ft^3/s Oct. 11-13, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1944 reached a stage of 25.8 ft, from floodmarks, discharge, 37,000 ft^3/s, from rating curve extended above 18,000 ft^3/s on basis of velocity-area study.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	2130	Ice jam	*18.00	Sept. 9	1000	*3,660	14.44

Minimum daily discharge, 12 ft^3/s Dec. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	24	45	19	120	33	134	173	446	199	60	114
2	23	24	54	18	90	32	126	161	286	167	56	90
3	22	26	53	18	80	35	120	136	261	147	52	73
4	23	30	39	19	70	50	114	124	334	129	52	64
5	21	33	46	22	64	70	107	119	308	114	53	74
6	19	35	42	60	60	60	102	110	525	103	54	67
7	19	35	35	52	58	55	95	97	448	95	55	66
8	20	37	30	49	56	50	102	95	351	89	43	1120
9	22	39	33	44	54	100	107	92	285	84	40	2690
10	23	36	29	37	52	500	94	87	252	79	39	1030
11	21	33	25	33	50	1500	89	83	302	75	37	492
12	19	44	20	29	48	1100	86	78	302	481	34	319
13	19	47	22	27	47	855	83	76	244	137	34	257
14	20	54	19	33	46	570	83	72	205	82	34	227
15	23	66	15	40	45	414	80	69	184	75	31	201
16	24	71	13	50	44	306	81	66	176	105	31	179
17	23	67	12	56	42	240	79	65	164	101	31	165
18	21	66	13	50	41	186	78	67	157	202	29	147
19	20	48	14	42	40	161	77	90	157	715	28	130
20	21	42	17	37	39	156	73	88	145	356	36	118
21	22	39	22	33	38	160	77	71	133	185	34	104
22	26	38	20	33	38	155	82	66	125	137	27	94
23	32	34	22	38	37	155	79	62	117	120	101	85
24	33	32	21	42	37	153	79	1420	112	109	124	79
25	34	35	20	48	36	151	80	1720	122	96	72	76
26	26	64	19	54	36	151	80	1570	151	87	427	74
27	25	62	18	68	35	156	170	856	174	82	332	72
28	23	67	17	76	34	164	187	583	165	95	133	70
29	23	71	19	250	---	169	218	854	177	69	95	69
30	24	45	20	350	---	162	199	477	236	64	143	67
31	25	---	19	180	---	148	---	373	---	65	137	---
TOTAL	721	1344	793	1907	1437	8197	3161	10000	7044	4644	2454	8413
MEAN	23.3	44.8	25.6	61.5	51.3	264	105	323	235	150	79.2	280
MAX	34	71	54	350	120	1500	218	1720	525	715	427	2690
MIN	19	24	12	18	34	32	73	62	112	64	27	64
AC-FT	1430	2670	1570	3780	2850	16260	6270	19830	13970	9210	4870	16690
CFSM	.01	.03	.02	.04	.03	.16	.06	.20	.14	.09	.05	.17
IN.	.02	.03	.02	.04	.03	.19	.07	.23	.16	.11	.06	.19

CAL YR 1988 TOTAL 102816 MEAN 281 MAX 1500 MIN 12 AC-FT 203900 CFSM .17 IN. 2.34
WTR YR 1989 TOTAL 50115 MEAN 137 MAX 2690 MIN 12 AC-FT 99400 CFSM .08 IN. 1.14

05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IA

LOCATION.--Lat 41°18'03", long 92°12'16", in NE1/4 SE1/4 sec.14, T.75 N., R.12 W., Keokuk County, Hydrologic Unit 07080106, on right bank 20 ft downstream from bridge on State Highway 149, 1.2 mi downstream from Cedar Creek, 2.2 mi south of Sigourney, 4.0 mi upstream from Bridge Creek, and 16.2 mi upstream from confluence with South Skunk River.

DRAINAGE AREA.--730 mi^2.

PERIOD OF RECORD.--October 1945 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1558: 1946-47 (M).

GAGE.--Water-stage recorder. Datum of gage is 651.53 ft above NGVD. Prior to June 10, 1953, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 28 to Mar. 12 and Mar. 21 to April 1. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--44 years, 440 ft^3/s, 8.18 in/yr, 318,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,500 ft^3/s Mar. 31, 1960, gage height, 25.33 ft; minimum daily discharge, 0.1 ft^3/s Oct. 7 to Nov. 15, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1944 reached a stage of 22.8 ft, from floodmark, discharge, 14,500 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	1530	*3,070	*14.91				

Minimum discharge, 6.7 ft^3/s Oct. 11, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	9.7	24	8.8	58	10	49	118	372	35	28	232
2	11	8.9	22	8.4	40	11	47	90	326	25	24	210
3	10	9.2	21	8.0	50	14	54	72	595	20	29	147
4	11	13	19	8.6	30	68	43	65	290	17	65	101
5	9.3	12	17	11	21	52	40	56	104	15	30	77
6	8.7	11	17	20	16	39	34	48	72	14	23	84
7	7.9	10	17	22	14	32	34	43	59	13	20	78
8	7.1	11	14	11	14	42	40	38	51	12	21	458
9	7.5	13	14	13	13	54	39	34	41	11	48	2810
10	7.3	15	13	17	13	160	42	29	38	11	40	2620
11	6.9	15	10	15	14	600	50	26	37	11	29	2820
12	7.6	15	9.4	14	15	520	48	23	64	31	28	1760
13	8.0	18	9.0	13	16	455	35	23	94	214	28	623
14	7.6	18	9.8	14	15	294	29	21	74	88	25	445
15	8.0	24	9.3	15	14	191	27	20	51	44	25	344
16	8.4	82	8.4	16	13	150	26	20	43	28	24	269
17	7.7	45	11	20	13	127	26	19	35	23	26	216
18	7.0	47	10	18	12	110	26	21	30	22	29	181
19	12	39	9.7	16	12	81	28	26	26	445	39	158
20	12	40	10	15	13	64	27	102	23	427	43	138
21	9.4	34	9.5	14	13	58	27	65	21	334	48	122
22	8.7	26	9.7	14	12	52	28	41	19	130	57	107
23	7.7	23	11	15	11	49	29	30	18	110	373	98
24	9.1	21	13	16	11	47	29	420	17	89	773	89
25	9.1	19	11	17	12	46	28	790	17	57	341	83
26	12	24	12	18	12	46	47	502	45	49	178	74
27	12	26	17	18	11	44	69	268	125	41	187	69
28	18	26	10	19	11	46	103	134	70	30	299	64
29	15	27	9.4	35	---	48	83	146	66	26	179	61
30	12	31	9.4	80	---	50	104	285	53	39	143	59
31	11	---	9.2	150	---	52	---	178	---	42	117	---
TOTAL	301.0	712.8	395.8	679.8	499	3612	1291	3753	2876	2453	3319	14597
MEAN	9.71	23.8	12.8	21.9	17.8	117	43.0	121	95.9	79.1	107	487
MAX	18	82	24	150	58	600	104	790	595	445	773	2820
MIN	6.9	8.9	8.4	8.0	11	10	26	19	17	11	20	59
AC-FT	597	1410	785	1350	990	7160	2560	7440	5700	4870	6580	28950
CFSM	.01	.03	.02	.03	.02	.16	.06	.17	.13	.11	.15	.67
IN.	.02	.04	.02	.03	.03	.18	.07	.19	.15	.13	.17	.74

CAL YR 1988 TOTAL 43244.7 MEAN 118 MAX 720 MIN 6.9 AC-FT 85780 CFSM .16 IN. 2.20
WTR YR 1989 TOTAL 34489.4 MEAN 94.5 MAX 2820 MIN 6.9 AC-FT 68410 CFSM .13 IN. 1.76

05473400 CEDAR CREEK NEAR OAKLAND MILLS, IA

LOCATION.--Lat. 40°55'20", long 91°40'10", in SE1/4 NW1/4 sec.28, T.71 N., R.7 W., Henry County, Hydrologic Unit 07080107, on left bank 30 ft upstream from bridge on county highway H46, 3.0 mi west of Oakland Mills, 2.9 mi upstream from Wolf Creek, and 4.3 mi upstream from mouth.

DRAINAGE AREA.--530 mi^2.

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1957 to 1977. July 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 565.07 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 28,29, Feb. 2 to Mar. 11, and June 22 to July 5. Records good except those for estimated daily discharges, which are poor. Occasional high-water measurements were made by U.S. Army Corps of Engineers in 1965, 1966, 1970 and 1974 and by U.S. Geological Survey in 1966 and 1967. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--12 years, 350 ft^3/s, 8.97 in/yr, 253,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,560 ft^3/s Apr. 3, 1983, gage height, 19.68 ft; minimum daily discharge, 0.42 ft^3/s Sept. 17, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 22, 1973 reached a stage of 24.09 ft, discharge not determined. Flood of June 1905 reached a stage approximately 2 feet higher from information by local resident.

EXTREMES FOR CURRENT PERIOD.--Peak discharges greater than base discharge of 3,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 10	1615	*3,660	*13.54	No other peak greater than base discharge.			

Minimum discharge, 0.57 ft^3/s Oct. 13, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71	2.1	7.5	11	16	4.5	18	70	195	70	36	373
2	32	2.1	7.3	9.2	12	4.3	17	105	87	41	19	216
3	17	2.1	6.8	8.6	10	5.0	14	208	163	31	14	71
4	10	2.4	5.7	7.6	11	22	12	103	1350	26	12	36
5	6.6	2.7	4.9	8.2	9.4	80	9.6	62	325	22	36	23
6	4.1	3.1	4.8	9.9	8.0	90	7.5	43	123	17	68	154
7	2.9	3.3	4.8	11	8.0	54	6.8	32	75	15	31	107
8	2.4	3.8	3.9	15	7.2	45	9.1	25	51	13	19	205
9	2.1	4.5	3.1	16	6.2	40	9.7	271	39	12	14	2110
10	2.0	6.7	3.2	12	5.4	38	12	233	53	10	10	3420
11	1.7	5.6	3.3	11	5.0	40	13	62	63	10	9.2	1000
12	1.4	6.2	4.0	13	4.9	100	8.3	32	474	9.3	7.9	305
13	.86	6.3	4.0	12	5.4	98	7.3	21	387	686	6.8	202
14	.65	11	4.4	8.9	5.0	65	7.1	17	189	850	6.6	120
15	.72	28	4.0	7.9	5.2	45	6.3	14	102	124	7.2	87
16	.75	17	4.0	6.8	5.0	33	5.2	12	61	63	6.4	69
17	.84	41	3.6	6.7	4.8	27	4.7	9.4	44	40	5.6	53
18	.86	146	3.5	7.1	4.7	22	5.2	8.5	34	31	5.5	42
19	.95	55	3.8	6.9	4.6	19	5.7	8.9	28	33	4.9	35
20	.97	29	4.9	7.5	4.5	17	5.8	10	24	60	6.9	29
21	.97	18	4.9	6.3	4.5	14	7.5	94	21	78	6.2	23
22	1.0	13	4.8	7.5	4.4	13	7.3	43	17	48	9.6	21
23	1.8	11	5.4	7.4	4.2	12	6.2	24	16	33	953	19
24	1.8	8.1	6.7	7.6	4.5	12	5.6	21	14	37	477	18
25	2.1	5.5	5.7	10	4.4	11	7.3	2010	13	72	175	16
26	2.7	8.4	7.0	11	4.6	10	9.6	642	12	40	77	15
27	5.0	8.1	11	7.8	4.9	9.4	199	141	70	26	35	14
28	3.0	6.6	8.0	9.4	4.4	11	285	81	400	20	29	13
29	2.0	9.6	7.0	14	---	11	287	57	370	17	24	13
30	1.6	8.4	11	13	---	26	133	50	120	20	23	13
31	2.0	---	14	14	---	23	---	51	---	89	96	---
TOTAL	183.77	474.6	177.0	304.3	178.2	1001.2	1131.8	4560.8	4920	2643.3	2230.8	8822
MEAN	5.93	15.8	5.71	9.82	6.36	32.3	37.7	147	164	85.3	72.0	294
MAX	71	146	14	16	16	100	287	2010	1350	850	953	3420
MIN	.65	2.1	3.1	6.3	4.2	4.3	4.7	8.5	12	9.3	4.9	13
AC-FT	365	941	351	604	353	1990	2240	9050	9760	5240	4420	17500
CFSM	.01	.03	.01	.02	.01	.06	.07	.28	.31	.16	.14	.55
IN.	.01	.03	.01	.02	.01	.07	.08	.32	.35	.19	.16	.62

CAL YR 1988 TOTAL 21321.97 MEAN 58.3 MAX 825 MIN .42 AC-FT 42290 CFSM .11 IN. 1.50
WTR YR 1989 TOTAL 26627.77 MEAN 73.0 MAX 3420 MIN .65 AC-FT 52820 CFSM .14 IN. 1.87

05474000 SKUNK RIVER AT AUGUSTA, IA
(National stream-quality accounting network station)

LOCATION.--Lat 40°45'13", long 91°16'40", in NE1/4 NE1/4 sec.26, T.69 N., R.4 W., Des Moines County, Hydrologic Unit 07080107, on left bank 300 ft upstream from bridge on State Highway 394 at Augusta, 2.0 mi upstream from Long Creek, and at mile 12.5.

DRAINAGE AREA.--4,303 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September to November 1913, October 1914 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS,--WSP 1308: 1915 (M), 1919-27 (M), 1932-34 (M), 1936, 1937-38 (M), 1942 (M). WSP 1438: Drainage area. WDR IA-71-1: 1966 (M).

GAGE.--Water-stage recorder. Datum of gage is 521.24 ft above NGVD. Prior to Nov. 15, 1913, nonrecording gage at site 400 ft upstream at datum about 0.7 ft higher. May 27, 1915, to Jan. 14, 1935, nonrecording gage at site 400 ft upstream at present datum.

REMARKS.--Estimated daily discharges: Feb. 3-25 and March 4-12. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--75 years (water years 1915-89), 2,428 ft^3/s, 7.66 in/yr, 1,759,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft^3/s Apr. 23, 1973, gage height, 27.05 ft; minimum daily discharge, 7 ft^3/s Aug. 27 to Sept. 1, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1, 1903, reached a stage of about 21 ft, discharge, about 45,000 ft^3/s. Stage and discharge for flood of April 1973 are believed to be the greatest since 1851.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 15,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept.9	2400	*10,600	*10.80				

Minimum discharge, 35 ft^3/s Dec. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	203	63	101	94	157	82	293	505	1410	456	216	1040
2	155	65	100	93	629	77	286	470	1660	367	183	1070
3	113	65	101	83	400	80	285	700	1240	305	149	753
4	95	72	94	67	140	150	265	761	2570	324	139	562
5	82	72	95	81	110	400	236	560	3480	287	129	449
6	71	68	94	100	94	330	208	415	1840	240	137	511
7	67	77	91	104	90	270	191	348	904	199	279	1420
8	64	71	86	63	90	260	212	291	678	177	198	1360
9	62	71	67	83	88	240	222	296	593	160	133	7120
10	62	74	71	94	88	280	207	563	684	144	115	10500
11	60	74	44	102	91	400	189	522	651	134	103	9700
12	55	90	56	103	94	520	191	342	927	129	100	6610
13	53	96	58	89	100	2150	178	230	1640	134	100	4860
14	53	109	70	96	105	2880	171	179	1000	1080	100	3510
15	53	108	63	102	98	2100	171	160	804	1110	101	2100
16	54	119	51	107	94	1440	164	147	640	734	94	1320
17	55	150	52	125	92	998	156	137	496	437	86	1010
18	54	112	57	124	90	800	153	128	408	281	82	841
19	54	232	56	120	89	672	150	128	358	303	81	726
20	52	284	72	110	88	547	145	125	315	270	89	636
21	55	178	68	92	88	457	140	117	285	245	90	562
22	56	136	68	95	86	378	139	156	257	784	88	502
23	72	124	79	101	80	328	147	195	244	930	1430	447
24	63	118	79	107	79	295	143	184	208	663	3090	397
25	69	113	59	107	86	290	147	331	181	470	957	361
26	66	121	70	109	91	284	174	3150	175	441	726	333
27	62	120	95	111	86	270	262	3100	240	341	823	303
28	59	117	54	110	81	281	520	2580	1400	251	718	280
29	61	108	82	107	---	297	748	1990	1950	200	519	264
30	61	101	96	125	---	321	673	1250	724	201	620	246
31	62	---	99	143	---	308	---	968	---	176	636	---
TOTAL	2203	3308	2328	3147	3504	18185	7166	21028	27962	11973	12311	59793
MEAN	71.1	110	75.1	102	125	587	239	678	932	386	397	1993
MAX	203	284	101	143	629	2880	748	3150	3480	1110	3090	10500
MIN	52	63	44	63	79	77	139	117	175	129	81	246
AC-FT	4370	6560	4620	6240	6950	36070	14210	41710	55460	23750	24420	118600
CFSM	.02	.03	.02	.02	.03	.14	.06	.16	.22	.09	.09	.46
IN.	.02	.03	.02	.03	.03	.16	.06	.18	.24	.10	.11	.52

CAL YR 1988 TOTAL 258964 MEAN 708 MAX 4600 MIN 44 AC-FT 513700 CFSM .16 IN. 2.24
WTR YR 1989 TOTAL 172908 MEAN 474 MAX 10500 MIN 44 AC-FT 343000 CFSM .11 IN. 1.49

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

LOCATION.--Samples collected at bridge on State Highway 394, 300 ft downstream from gage.

PERIOD OF RECORD.--Water years 1975 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1975 to current year.
WATER TEMPERATURES: October 1975 to current year.
SUSPENDED-SEDIMENT DISCHARGE: October 1975 to current year.

REMARKS.--During periods of ice effect, sediment samples are collected in open water channel. Records of specific conductance are obtained from suspended sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens Dec. 20, 1979, Feb. 12, 1980; minimum daily, 180 microsiemens Aug. 17, 1986.
WATER TEMPERATURES: Maximum daily, 34.0°C July 20, 1980, Aug. 15-17, 1988, July 10-13, 1989; minimum daily, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,550 mg/L June 25, 1981; minimum daily mean, 1 mg/L Mar. 8, 9, 12, 1978, Jan. 5, 6, 1984.
SEDIMENT LOADS: Maximum daily, 499,000 tons Mar. 21, 1978; minimum daily, 1.4 tons Dec. 11, 1989.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 915 microsiemens Jan. 10; minimum daily, 210 microsiemens July 15.
TEMPERATURES: Maximum daily, 34.0°C July 10-13; minimum daily, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 4,260 mg/L May 26; minimum daily mean, 7 mg/L Dec. 7, Jan. 20, 21.
SEDIMENT LOADS: Maximum daily, 54,700 tons Sept. 10; minimum daily, 1.4 tons Dec. 11.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	400	612	645	774	550	683	589	530	510	430	445	320
2	360	613	680	642	525	652	627	525	430	435	450	330
3	380	582	670	660	498	670	642	571	430	435	475	315
4	500	617	688	670	505	490	620	617	435	470	430	375
5	540	550	659	676	498	635	625	541	340	520	445	390
6	500	626	640	602	498	400	626	587	300	520	430	385
7	460	645	618	614	455	420	610	606	330	520	485	330
8	430	643	652	633	448	477	597	588	360	485	510	280
9	400	666	683	850	457	456	623	575	415	510	475	250
10	420	672	700	915	451	430	671	637	540	530	520	225
11	430	657	735	850	455	430	645	502	505	510	531	235
12	440	675	779	708	462	450	627	525	450	510	520	270
13	460	659	745	726	452	477	640	585	415	475	520	290
14	480	695	652	680	459	354	628	619	400	490	525	325
15	500	770	645	695	428	287	621	655	480	210	470	375
16	500	645	630	712	445	285	620	670	560	370	510	440
17	---	635	684	717	462	287	626	650	580	400	490	475
18	476	765	675	688	485	296	592	638	595	390	500	510
19	526	766	698	680	501	314	605	657	600	350	520	475
20	550	755	626	680	508	331	632	682	615	400	540	510
21	538	836	591	675	536	357	654	713	585	370	555	530
22	540	740	613	670	533	374	657	665	590	410	550	555
23	553	690	610	616	614	445	670	665	605	375	390	540
24	580	680	636	580	647	465	692	700	625	350	215	560
25	592	630	688	572	654	479	695	690	615	350	245	540
26	582	587	710	542	650	465	688	275	585	355	320	530
27	615	592	634	529	637	465	658	345	480	355	405	525
28	640	579	664	528	640	465	760	310	435	385	265	500
29	633	597	713	534	---	495	653	365	430	380	275	480
30	646	624	808	555	---	519	609	380	430	400	305	460
31	622	---	807	554	---	560	---	410	---	400	385	---

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22.0	9.0	3.0	2.0	5.0	1.0	11.0	14.0	25.0	28.0	30.0	26.0
2	21.0	9.0	4.0	1.0	5.0	1.0	10.0	16.0	25.0	30.0	31.0	26.0
3	19.0	10.0	5.0	1.0	.0	1.0	11.0	19.0	25.0	30.0	31.0	24.0
4	19.0	10.0	4.0	2.0	.0	1.0	11.0	16.0	23.0	32.0	33.0	24.0
5	15.0	9.0	4.0	2.0	.0	1.0	11.0	16.0	23.0	30.0	33.0	25.0
6	15.0	9.0	6.0	2.0	.0	2.0	11.0	12.0	25.0	33.0	27.0	26.0
7	14.0	6.0	6.0	2.0	.0	2.0	13.0	17.0	26.0	33.0	25.0	27.0
8	14.0	7.0	2.0	1.0	.0	2.0	9.0	17.0	26.0	33.0	25.5	24.0
9	15.0	8.0	2.0	1.0	.0	2.0	9.0	20.0	22.0	33.0	27.0	20.0
10	16.0	8.0	2.0	1.0	.0	3.0	10.0	21.0	21.0	34.0	27.0	20.0
11	16.0	6.0	2.0	2.0	1.0	8.0	11.0	21.0	21.0	34.0	28.0	22.0
12	15.0	6.0	2.0	2.0	1.0	8.0	11.0	21.0	24.0	34.0	28.0	19.0
13	15.0	7.0	2.5	3.0	1.0	5.0	15.0	21.0	23.0	34.0	28.0	18.0
14	14.0	10.0	2.0	2.0	1.0	7.0	15.0	23.0	23.0	30.0	29.0	19.0
15	17.0	12.0	1.0	1.0	1.0	5.0	15.0	21.0	20.0	24.0	28.0	18.0
16	18.0	7.0	1.0	1.0	1.0	7.0	18.0	22.0	24.0	28.0	28.0	20.0
17	---	8.0	1.0	3.0	1.0	4.0	18.0	24.0	25.0	28.0	27.0	22.0
18	15.0	8.0	2.0	3.0	1.0	5.0	15.0	24.0	25.0	28.0	27.0	24.0
19	13.0	8.0	3.0	3.0	1.0	4.0	15.0	24.0	27.0	24.0	24.0	24.0
20	11.0	5.0	2.0	3.0	1.0	4.0	19.0	24.0	29.0	27.0	27.0	23.0
21	12.0	5.0	2.0	3.0	1.0	5.0	21.0	22.0	30.0	24.0	26.0	23.0
22	12.0	5.0	3.0	5.0	1.0	7.0	17.0	21.0	30.0	26.0	28.0	20.0
23	11.0	8.0	3.0	4.0	2.0	10.0	17.0	22.0	30.0	26.0	23.0	18.0
24	9.0	10.0	3.0	5.0	2.0	15.0	24.0	26.0	31.0	29.0	22.0	17.0
25	10.0	8.0	2.0	5.0	2.0	15.0	27.0	23.0	31.0	31.0	24.0	18.0
26	8.5	8.0	2.0	4.0	2.0	19.0	27.0	19.0	31.0	31.0	25.0	19.0
27	---	7.0	1.0	5.0	2.0	20.0	25.0	21.0	29.0	30.0	27.0	19.0
28	8.0	4.0	1.0	5.0	2.0	18.0	23.0	19.0	28.0	31.0	27.0	19.0
29	8.0	4.0	1.0	5.0	---	16.0	20.0	21.0	26.0	28.0	28.0	20.0
30	6.0	4.0	1.0	5.0	---	12.0	20.0	25.0	28.0	28.0	28.0	20.0
31	8.0	---	1.0	5.0	---	12.0	---	25.0	---	30.0	27.0	---

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	125	69	28	4.8	30	8.2	13	3.3	24	10	9	2.0
2	119	50	20	3.5	13	3.5	23	5.8	87	148	8	1.7
3	212	65	22	3.9	13	3.5	16	3.6	105	113	8	1.7
4	142	36	65	13	13	3.3	16	2.9	75	28	40	16
5	69	15	42	8.2	13	3.3	18	3.9	85	25	84	91
6	59	11	34	6.2	24	6.1	45	12	71	18	67	60
7	55	9.9	24	5.0	31	7.6	44	12	79	19	53	39
8	54	9.3	18	3.5	31	7.2	51	8.7	80	19	55	39
9	94	16	21	4.0	73	13	26	5.8	77	18	36	23
10	87	15	28	5.6	31	5.9	17	4.3	83	20	35	26
11	76	12	20	4.0	12	1.4	21	5.8	105	26	44	[illegible]
12	50	7.4	24	5.8	32	4.8	28	7.8	97	25	44	[illegible]
13	47	6.7	181	47	31	4.9	22	5.3	90	24	301	2200
14	68	9.7	39	11	30	5.7	20	5.2	72	20	580	4510
15	75	11	35	10	26	4.4	18	5.0	82	22	362	2050
16	97	14	68	22	35	4.8	14	4.0	74	19	263	1020
17	102	15	34	14	36	5.1	11	3.7	55	14	172	463
18	101	15	47	14	39	6.0	10	3.3	58	14	113	244
19	149	22	36	23	36	5.4	8	2.6	53	13	74	134
20	157	22	108	83	29	5.6	7	2.1	41	9.7	51	75
21	253	38	45	22	18	3.3	7	1.7	30	7.1	40	49
22	134	20	24	8.8	16	2.9	25	6.4	25	5.8	38	39
23	115	22	19	6.4	22	4.7	37	10	22	4.8	55	49
24	114	19	21	6.7	29	6.2	37	11	19	4.1	45	36
25	73	14	69	21	30	4.8	31	9.0	12	2.8	43	34
26	23	4.1	95	31	20	3.8	23	6.8	12	2.9	55	42
27	29	4.9	53	17	36	9.2	16	4.8	12	2.8	54	39
28	30	4.8	58	18	33	4.8	15	4.5	10	2.2	68	52
29	45	7.4	51	15	20	4.4	19	5.5	---	---	69	55
30	34	5.6	66	18	9	2.3	15	5.1	---	---	49	42
31	30	5.0	---	---	7	1.9	21	8.1	---	---	32	27
TOTAL	---	575.8	---	455.4	---	158.0	---	180.0	---	637.2	---	11569.4

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

WATER-QUALITY RECORDS

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	25	20	167	228	720	2740	234	288	102	59	388	1090
2	30	23	233	296	1320	5920	141	140	125	62	350	1010
3	42	32	185	350	710	2380	109	90	128	51	295	600
4	49	35	180	370	1500	10400	96	84	114	43	225	341
5	48	31	181	274	1890	17800	79	61	124	43	167	202
6	54	30	135	151	1300	6460	67	43	114	42	205	283
7	65	34	85	80	730	1780	59	32	111	84	533	2040
8	45	26	96	75	520	952	64	31	94	50	624	2900
9	20	12	107	86	390	624	62	27	62	22	2190	45000
10	20	11	136	207	350	646	54	21	67	21	1930	54700
11	23	12	120	169	1300	2290	65	24	65	18	1150	30100
12	37	19	128	118	502	1300	55	19	52	14	800	14300
13	50	24	134	83	768	3400	58	21	45	12	560	7350
14	44	20	94	45	560	1510	264	1500	65	18	390	3700
15	44	20	77	33	376	816	580	1740	70	19	298	1690
16	67	30	67	27	283	489	322	638	68	17	208	741
17	54	23	78	29	193	258	187	221	70	16	141	385
18	51	21	78	27	133	147	150	114	65	14	122	277
19	54	22	68	24	108	104	149	122	64	14	104	204
20	44	17	59	20	74	63	152	111	72	17	93	160
21	33	12	70	22	47	36	150	99	69	17	89	135
22	52	20	94	40	35	24	311	692	68	16	75	102
23	78	31	75	39	35	23	328	824	1400	5410	70	84
24	44	17	66	33	37	21	300	537	2320	15000	65	70
25	38	15	100	197	35	17	287	364	650	22700	43	42
26	58	27	4260	37100	32	15	258	307	365	715	40	36
27	168	119	3480	29100	41	27	204	188	152	338	40	33
28	66	93	3590	25000	659	4130	155	105	102	198	40	30
29	102	206	3130	16800	1330	7250	133	72	107	150	39	28
30	98	178	1260	4250	513	1070	127	69	148	248	35	23
31	---	---	690	1800	---	---	124	59	285	489	---	---
TOTAL	---	1180	---	117073	---	72692	---	8643	---	45917	---	167656
YEAR		426736.8										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
26...	1145	7.5	66	18	3.2	--	--	--	--	100
MAR										
22...	1545	6.0	373	39	39	--	--	--	--	100
MAY										
02...	1300	16.0	444	214	257	83	90	94	96	100
26...	1815	19.0	3430	4630	42900	44	71	90	97	100
JUL										
05...	1400	29.5	284	84	64	--	--	--	--	99
AUG										
22...	1300	27.5	87	68	16	--	--	--	--	100

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TEMPER-ATURE AIR (DEG C) (00020)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT 26...	1145	66	542	8.60	7.5	3.0	5.8	11.4	97	751	88	K60
DEC 13...	1145	53	742	8.90	0.5	4.0	4.9	20.0	141	751	K10	K27
MAR 22...	1545	373	360	7.90	6.0	6.0	4.0	12.8	104	752	K8	100
MAY 02...	1300	444	462	8.20	16.0	10.5	130	8.0	82	754	320	220
JUL 05...	1400	284	490	9.00	29.5	28.5	33	14.8	197	753	160	K68
AUG 22...	1300	87	518	8.60	27.5	28.0	22	7.3	94	749	92	K190

DATE	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
OCT 26...	45	240	59	22	26	19	0.8	5.3	186	0	226	70
DEC 13...	64	270	64	26	47	27	1	6.4	206	10	232	100
MAR 22...	45	150	40	11	13	15	0.5	7.4	107	0	131	45
MAY 02...	57	180	48	15	20	19	0.7	7.4	106	0	129	64
JUL 05...	52	210	55	18	21	17	0.7	6.9	158	20	153	54
AUG 22...	36	230	57	21	21	16	0.6	6.4	195	3	232	49

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 26...	38	0.30	0.75	332	339	0.45	59.0	--	0.430	<0.010	<0.010	<0.010
DEC 13...	45	0.40	0.91	423	412	0.58	61.0	1.1	0.100	0.020	0.030	0.030
MAR 22...	17	0.20	8.2	226	213	0.31	228	1.0	1.90	0.040	1.30	1.30
MAY 02...	19	0.40	6.4	277	264	0.38	332	0.87	1.60	0.110	0.860	0.830
JUL 05...	24	0.30	5.9	285	286	0.39	219	2.2	1.10	0.030	0.050	0.040
AUG 22...	23	0.40	0.48	314	295	0.43	73.7	--	<0.100	<0.010	0.030	<0.010

K Results based on colony count outside ideal range.

05474000 SKUNK RIVER AT AUGUSTA, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P) (00671)	PHOSPHOROUS DISSOLVED (MG/L AS P) (00666)	PHOSPHOROUS TOTAL (MG/L AS P) (00665)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)
OCT 26...	0.80	<0.010	0.030	0.060	18	3.2	100	1	<10	140	<0.5	<1
DEC 13...	1.1	0.010	0.020	0.060	--	--	--	--	--	--	--	--
MAR 22...	2.3	0.170	0.200	0.260	39	39	100	2	20	130	<0.5	<1
MAY 02...	1.7	0.090	0.120	0.190	214	257	100	1	20	190	<0.5	<1
JUL 05...	2.2	0.050	0.070	0.130	84	64	99	--	--	--	--	--
AUG 22...	0.60	0.070	0.090	0.110	68	16	100	1	50	140	<0.5	<1

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)
OCT 26...	<1	<3	4	10	6	12	8	<0.1	<10	3	<1
DEC 13...	--	--	--	--	--	--	--	--	--	--	--
MAR 22...	<1	<3	3	41	<5	5	75	<0.1	<10	5	1
MAY 02...	<1	<3	3	28	<1	10	40	<0.1	<10	7	<1
JUL 05...	--	--	--	--	--	--	--	--	--	--	--
AUG 22...	<1	<3	4	10	<1	9	51	<0.1	<10	3	<1

[Pesticide concentration expressed as total recoverable]

DATE	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	ATRAZINE, TOTAL (UG/L) (39630)	CYANAZINE TOTAL (UG/L) (81757)	METRIBUZIN IN WHOLE WATER (UG/L) (81408)	ALACHLOR TOTAL RECOVER (UG/L) (77825)	METOLACHLOR IN WHOLE WATER (UG/L) (39356)	TRIFLURALIN TOTAL RECOVER (UG/L) (39030)	BUTYLATE (UG/L) (99901)
OCT 26...	<1.0	200	<6	7	--	--	--	--	--	--	--
DEC 13...	--	--	--	--	--	--	--	--	--	--	--
MAR 22...	<1.0	110	<6	15	0.42	0.14	0.33	<0.10	<0.10	<0.10	<0.10
MAY 02...	<1.0	170	<6	33	22	29.0	11.0	3.90	0.10	0.55	<0.10
JUL 05...	--	--	--	--	7.3	4.3	1.00	0.20	<0.10	<0.10	<0.10
AUG 22...	<1.0	200	<6	7	--	--	--	--	--	--	--

05474500 MISSISSIPPI RIVER AT KEOKUK, IA

LOCATION.--Lat 40°23'37", long 91°22'27", in SE1/4 SW1/4 sec.30, T.65 N., R.4 W., Lee County, Hydrologic Unit 07080104, near right bank in tailwater of dam and powerplant of Union Electric Co. at Keokuk, 0.2 mi upstream from bridge on U.S. Highway 136, 2.7 mi upstream from Des Moines River, and at mile 364.2 upstream from Ohio River.

DRAINAGE AREA.--119,000 mi^2, approximately.

PERIOD OF RECORD.--January 1878 to current year.

GAGE.--Water-stage recorder. Datum of gage is 477.41 ft above NGVD (levels by U.S. Army Corps of Engineers). Jan. 1, 1878 to May 1913, nonrecording gage at Galland (formerly Nashville), 8 mi upstream; zero of gage was set to low-water mark of 1864, or 496.52 ft above NGVD.

REMARKS.--Discharge computed from records of operation of turbines in powerplant and spillway gates in dam. Minor flow regulation caused by powerplant since 1913 and navigation dams. Records for May 1913 to September 1937 adjusted for change in contents in Keokuk Reservoir, those after September 1937 unadjusted.

COOPERATION.--Records provided by Union Electric Co.

AVERAGE DISCHARGE.--111 years, 63,900 ft^3/s, 7.29 in/yr, 46,296,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 344,000 ft^3/s Apr. 24, 1973; maximum gage height, 23.35 ft Apr. 24, 1973; minimum daily discharge, 5,000 ft^3/s Dec. 27, 1933.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 6, 1851, reached a stage of 21.0 ft, present site and datum, estimated as 13.5 ft at Galland, discharge, 360,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 126,000 ft^3/s Apr. 8; minimum daily discharge, 11,300 ft^3/s Aug. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20400	20800	39100	30400	41800	28600	101000	65300	57000	30600	17200	31600
2	22900	19700	33800	30300	45400	28100	105000	61900	59100	34400	18400	35300
3	28700	21300	31600	30800	45100	27400	112000	67900	77000	37800	19600	42900
4	33100	23000	29300	29000	32300	28000	113000	63300	80900	34700	20900	39100
5	32500	25600	28900	28400	20200	30300	117000	60100	80000	34400	29500	33500
6	30600	26100	29900	29600	16800	32100	120000	58600	85600	30600	37100	30800
7	28300	26300	31300	29600	23400	37000	122000	60000	84000	30100	34000	32300
8	23300	27600	32400	25800	23700	34400	126000	60400	79500	29300	31500	40900
9	19900	30100	32900	19700	26200	33200	124000	64700	81700	27200	29700	57100
10	17600	25200	31800	22000	27800	32500	116000	63300	86100	24900	25300	72700
11	16800	21300	28500	29300	28400	34600	109000	62600	84300	24400	18800	72300
12	16300	25800	21100	28600	32000	44900	102000	62800	75500	26100	11300	60100
13	17100	28900	15900	27300	32300	70400	95400	61400	59200	28000	11900	46400
14	16800	29600	12100	26300	32900	71300	89200	60500	52300	24000	12200	44800
15	16300	29800	13200	26400	31800	77700	91500	59700	48400	22000	14000	40000
16	17100	27100	14300	28000	32100	77900	89300	57500	35700	18800	15800	34400
17	19000	25600	19500	28200	33100	72800	89900	54600	23900	15800	16200	27400
18	23100	31300	20900	27000	30000	77900	91100	55200	29000	15200	22000	18800
19	25000	36500	21000	27000	30000	78100	86600	50900	33700	18100	24200	19900
20	25200	40000	20800	27100	30400	70800	85600	53100	40200	25000	24300	19100
21	24400	40800	26000	25900	30000	73500	76500	50900	44300	26600	23300	18900
22	24000	40700	27200	25800	30600	76300	77100	50300	44600	26900	21200	22800
23	24500	40800	29300	28300	30500	64800	74700	48600	43000	26900	22400	30200
24	23800	40300	29500	28100	29400	56500	76200	44900	41800	26800	28200	29500
25	22800	38900	28400	28100	29300	48900	67200	38600	41100	27200	26500	24300
26	21300	37500	29300	30300	29700	50100	70100	40400	36400	27100	26100	20100
27	20900	38400	33100	28200	29600	53200	71300	43900	29300	24600	25300	18300
28	19700	38900	31000	28200	29000	59400	67500	44600	27100	21700	24600	18300
29	21400	36800	29500	30400	---	81000	67300	46900	30400	19300	25900	20200
30	23900	38700	28100	33900	---	94600	69900	46000	30000	16600	28300	22400
31	23300	---	29300	39000	---	97600	---	50500	---	18100	27800	---
TOTAL	700000	933400	829000	877000	853800	1743900	2803400	1709400	1621100	793200	713500	1024400
MEAN	22580	31110	26740	28290	30490	56250	93450	55140	54040	25590	23020	34150
MAX	33100	40800	39100	39000	45400	97600	126000	67900	86100	37800	37100	72700
MIN	16300	19700	12100	19700	16800	27400	67200	38600	23900	15200	11300	18300
AC-FT	1388000	1851000	1644000	1740000	1694000	3459000	5561000	3391000	3215000	1573000	1415000	2032000

CAL YR 1988 TOTAL 14239900 MEAN 38910 MAX 107000 MIN 11900 AC-FT 28240000
WTR YR 1989 TOTAL 14602100 MEAN 40010 MAX 126000 MIN 11300 AC-FT 28960000

05476500 DES MOINES RIVER AT ESTHERVILLE, IA

LOCATION.--Lat 43°23'51", long 94°50'38", in SW1/4 SE1/4 sec.10, T.99 N., R.34 W., Emmet County, Hydrologic Unit 07100002, on right bank in city park, 1,200 ft downstream from bridge on State Highway 9 at Estherville, 0.1 mi upstream from School Creek, 2.3 mi upstream from Brown Creek, and at mile 404.2.

DRAINAGE AREA.--1,372 mi^2.

PERIOD OF RECORD.--October 1951 to current year. Prior to November 1951, monthly discharge only, published in WSP 1728.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,247.55 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 18-20, Jan. 2, 3, 7-10, and Feb. 2-10, 21-24. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--38 years, 382 ft^3/s, 3.78 in/yr, 276,800 acre-ft/yr; median of yearly mean discharges, 250 ft^3/s, 2.5 in/yr, 181,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft^3/s Apr. 12, 1969, gage height, 17.68 ft, from floodmark; no flow Jan. 16-18, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater then base discharge of 1,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 29	0630	*915	*4.50				

Minimum discharge, 2.7 ft^3/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	12	9.8	4.8	7.7	4.5	407	166	64	22	39	11
2	8.9	9.3	9.1	4.0	4.0	4.4	329	154	68	16	36	9.0
3	10	9.1	8.9	4.1	3.8	4.3	288	148	80	20	34	8.1
4	9.1	9.4	8.0	4.4	4.0	4.3	259	149	83	37	30	18
5	7.8	7.5	7.6	4.4	4.1	4.3	237	148	71	41	32	29
6	6.5	7.4	7.9	4.4	4.2	4.4	200	140	65	40	27	13
7	6.2	8.4	8.1	4.0	4.5	4.2	178	127	61	37	22	18
8	5.8	9.9	7.7	3.9	4.8	4.2	179	111	64	35	19	16
9	5.5	9.1	7.3	3.8	4.5	7.3	170	100	60	30	15	14
10	5.2	9.0	7.0	3.9	4.4	105	155	97	57	24	12	10
11	4.5	7.3	6.1	4.2	4.6	283	136	93	50	54	9.3	8.1
12	4.4	7.2	5.8	4.0	4.6	227	126	89	45	83	8.1	6.4
13	4.6	7.3	6.0	4.0	4.7	257	120	87	46	55	24	5.5
14	5.1	7.5	6.3	4.0	4.7	204	120	82	53	55	13	5.0
15	5.5	10	6.0	4.1	4.5	126	119	72	48	83	11	4.3
16	4.6	13	5.3	4.1	4.5	122	115	66	41	77	11	4.0
17	4.7	10	5.3	4.1	4.4	67	106	62	33	79	9.3	3.9
18	4.8	11	5.3	4.2	4.4	76	101	60	27	94	8.3	4.1
19	12	9.8	5.5	4.4	4.4	170	90	63	20	108	9.8	4.9
20	7.0	8.8	5.8	4.6	4.3	189	86	64	17	111	8.3	4.4
21	5.1	8.4	5.6	4.8	4.4	156	85	59	18	115	12	4.7
22	5.1	8.7	5.8	4.8	4.0	173	85	54	24	109	12	5.2
23	7.3	8.7	6.0	5.1	4.2	220	82	58	15	84	14	5.8
24	5.9	9.3	6.0	5.4	4.0	295	111	70	22	51	12	5.7
25	7.7	9.9	5.8	5.6	4.3	397	107	61	25	45	12	4.8
26	7.2	11	5.7	5.6	4.4	541	146	44	24	46	21	4.0
27	7.2	10	5.8	5.6	4.4	567	151	33	23	47	12	3.9
28	7.7	7.1	5.3	5.8	4.3	791	167	25	26	45	13	3.5
29	8.4	8.8	4.7	5.9	---	858	180	24	29	47	13	3.3
30	7.9	11	4.5	6.5	---	658	175	20	26	45	16	3.0
31	7.9	---	4.6	7.9	---	511	---	41	---	43	15	---
TOTAL	209.6	275.9	198.6	146.4	125.1	7034.9	4810	2567	1285	1778	530.1	240.6
MEAN	6.76	9.20	6.41	4.72	4.47	227	160	82.8	42.8	57.4	17.1	8.02
MAX	12	13	9.8	7.9	7.7	858	407	166	83	115	39	29
MIN	4.4	7.1	4.5	3.8	3.8	4.2	82	20	15	16	8.1	3.0
AC-FT	416	547	394	290	248	13950	9540	5090	2550	3530	1050	477
CFSM	.00	.01	.00	.00	.00	.17	.12	.06	.03	.04	.01	.01
IN.	.01	.01	.01	.00	.00	.19	.13	.07	.03	.05	.01	.01

CAL YR 1988 TOTAL 55708.3 MEAN 152 MAX 978 MIN 2.8 AC-FT 110500 CFSM .11 IN. 1.51
WTR YR 1989 TOTAL 19201.2 MEAN 52.6 MAX 858 MIN 3.0 AC-FT 38090 CFSM .04 IN. .52

05476750 DES MOINES RIVER AT HUMBOLDT, IA

LOCATION.--Lat 42°43'12", long 94°13'06", in SE1/4 SW1/4 sec.1, T.91 N., R.29 W., Humboldt County, Hydrologic Unit 07100002 on left bank 5 ft downstream from First Avenue in city of Humboldt, about 700 ft downstream from City of Humboldt water plant, 3.2 mi downstream from dam, 3.2 mi upstream from Indian Creek, 3.9 mi upstream from East Fork Des Moines River, and at mile 334.3 upstream form mouth of Des Moines River.

DRAINAGE AREA.--2,256 mi^2.

PERIOD OF RECORD.--October 1964 to current year. Prior to October 1970, published as West Fork Des Moines River at Humboldt.

GAGE.--Water-stage recorder. Datum of gage is 1,053.54 ft above NGVD. Prior to Oct. 3, 1966, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 28, Dec. 25-29, Jan. 24-26, and Feb. 2-26. Records good except those for estimated daily discharges, which are poor. Daily nonrecording gage readings available in Iowa City district office for period Mar. 7, 1940, to Sept. 30, 1964. Discharge not published for this period because of extreme regulation at dam 3.2 mi upstream from gage. Power generation and streamflow regulation discontinued August 1964. Low-flow discharges occasionally affected by minor regulation. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corp of Engineers data collection platform at station.

AVERAGE DISCHARGE.--25 years, 918 ft^3/s, 5.53 in/yr, 665,100 acre-ft/yr; median of yearly mean discharges, 750 ft^3/s, 4.5 in/yr, 543,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft^3/s Apr. 14, 1969, gage height, 15.40 ft; minimum daily discharge, 13 ft^3/s Nov. 12, 1976, Jan. 12 to Feb. 2, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 23, 1947, reached a stage of 12.2 ft, discharge, 11,000 ft^3/s at present site and datum.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 30	1545	*994	*4.57				

Minimum discharge, 12 ft^3/s Sept. 22, caused by sluicing at dam upstream of the station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	92	72	64	56	62	44	708	329	157	77	87	42
2	81	71	81	56	40	43	585	311	144	75	95	36
3	77	69	84	53	34	43	503	299	149	74	78	37
4	73	76	84	50	35	43	450	292	155	68	77	86
5	71	182	81	78	37	40	414	281	150	63	81	60
6	69	83	78	75	39	35	381	270	142	59	69	51
7	68	71	76	68	38	34	360	265	139	66	60	76
8	68	71	73	66	40	34	351	262	137	71	58	90
9	68	71	65	59	38	68	325	253	131	71	55	75
10	56	73	58	54	41	157	311	245	129	69	53	64
11	50	68	57	48	39	446	222	231	130	151	50	71
12	54	89	56	44	43	784	277	228	139	108	49	61
13	55	89	56	43	45	774	271	230	131	86	53	59
14	57	81	58	42	43	531	259	230	121	89	69	58
15	60	98	58	41	42	332	247	225	118	101	64	57
16	63	112	56	43	44	409	244	213	117	91	56	54
17	78	83	53	43	41	244	234	191	115	93	53	52
18	71	91	52	43	42	197	228	200	112	128	52	48
19	71	100	54	47	40	235	218	207	105	120	51	34
20	66	80	79	47	42	260	216	181	95	130	51	32
21	71	57	67	48	43	257	208	168	86	139	52	32
22	68	66	66	52	40	284	220	160	97	134	52	28
23	83	103	69	54	38	328	207	163	94	136	41	23
24	70	112	68	52	43	416	205	467	84	138	34	23
25	75	108	66	48	52	559	203	698	106	135	35	28
26	70	118	60	46	49	632	270	442	116	116	42	26
27	78	116	56	54	46	695	300	310	102	97	48	25
28	61	93	58	56	46	829	367	239	94	82	56	28
29	49	65	60	56	---	811	368	227	89	100	63	26
30	57	58	56	58	---	965	340	193	83	91	54	25
31	67	---	56	69	---	891	---	170	---	86	46	---
TOTAL	2097	2626	2005	1649	1182	11420	9492	8180	3567	3044	1784	1407
MEAN	67.6	87.5	64.7	53.2	42.2	368	316	264	119	98.2	57.5	46.9
MAX	92	182	84	78	62	965	708	698	157	151	95	90
MIN	49	57	52	41	34	34	203	160	83	59	34	23
AC-FT	4160	5210	3980	3270	2340	22650	18830	16230	7080	6040	3540	2790
CFSM	.03	.04	.03	.02	.02	.16	.14	.12	.05	.04	.03	.02
IN.	.03	.04	.03	.03	.02	.19	.16	.13	.06	.05	.03	.02

CAL YR 1988 TOTAL 123807 MEAN 338 MAX 2080 MIN 36 AC-FT 245600 CFSM .15 IN. 2.04
WTR YR 1989 TOTAL 48453 MEAN 133 MAX 965 MIN 23 AC-FT 96110 CFSM .06 IN. .80

05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IA

LOCATION.--Lat 42°43'26", long 94°11'30", in NW1/4 SE1/4 sec.6, T.91 N., R.28 W., Humboldt County, Hydrologic Unit 07100003, on right bank 50 ft upstream from old mill dam, in city park at east edge of Dakota City, 500 ft upstream from bridge on county highway P56, 0.6 mi downstream from bridge on State Highway 3, 3.4 mi upstream from confluence with Des Moines River, and at mile 333.8 upstream from mouth of Des Moines River.

DRAINAGE AREA.--1,308 mi^2.

PERIOD OF RECORD.--March 1940 to current year. Prior to October 1954, published as "near Hardy".

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1944, 1945-47 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,038.71 ft above NGVD. Prior to Oct. 1, 1954, nonrecording gage at site 8 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 20, 21, 26-30, Dec. 1, and Jan. 1 to Mar. 26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--49 years, 542 ft^3/s, 5.63 in/yr, 392,700 acre-ft/yr; median of yearly mean discharges, 490 ft^3/s, 5.1 in/yr, 355,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,800 ft^3/s June 21, 1954, gage height, 16.95 ft, from floodmark, site and datum then in use; minimum daily discharge, 4.8 ft^3/s Jan. 11-14, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1954, reached a stage of 24.02 ft, discharge, 17,400 ft^3/s at present site. Flood of September 1938 reached a stage of 17.4 ft, discharge, about 22,000 ft^3/s, site and datum in use during the period 1940-54.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 24	2300	*1,840	*11.11	No other peak greater than base discharge.			

Minimum discharge, 9.7 ft^3/s Sept. 2, 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	37	34	27	34	22	221	624	157	75	28	12
2	42	35	38	23	30	21	180	503	138	76	25	11
3	34	34	35	25	22	22	155	381	124	63	22	10
4	30	38	33	37	20	23	135	312	113	49	22	26
5	28	37	35	34	21	22	119	275	103	43	24	27
6	26	39	35	33	21	22	111	241	93	36	22	22
7	26	39	30	24	22	21	105	221	85	32	20	28
8	25	39	25	20	23	56	105	205	83	28	19	35
9	24	38	25	19	22	96	99	186	76	25	18	28
10	25	39	26	19	25	140	94	173	73	24	16	23
11	24	40	21	22	27	195	88	159	70	43	16	19
12	23	45	23	21	24	380	81	147	74	101	15	19
13	24	44	26	23	22	460	78	133	71	108	19	18
14	22	44	27	24	23	430	75	124	64	75	27	17
15	23	45	24	26	22	340	71	118	61	62	26	16
16	25	53	19	28	21	350	68	111	56	50	24	16
17	30	48	19	27	20	440	67	107	53	43	22	15
18	31	44	21	28	22	210	62	104	51	69	21	14
19	29	45	24	23	21	230	61	112	48	65	20	14
20	31	34	36	21	20	210	60	110	42	74	18	14
21	33	33	35	26	21	200	59	104	38	74	17	13
22	33	44	32	28	20	170	95	110	40	67	17	13
23	34	43	34	27	19	165	149	104	41	53	15	12
24	35	39	38	26	24	185	202	1300	39	46	14	12
25	33	39	36	25	27	220	360	1620	45	40	13	12
26	35	45	35	23	25	350	298	824	93	36	16	12
27	33	43	32	26	24	505	244	452	120	33	18	11
28	36	38	29	25	23	523	394	309	82	31	18	11
29	33	38	27	25	---	437	517	279	65	33	17	11
30	33	35	27	27	---	357	607	220	61	30	15	10
31	34	---	28	39	---	283	---	181	---	29	13	---
TOTAL	948	1214	909	801	645	7085	4960	9849	2259	1613	597	501
MEAN	30.6	40.5	29.3	25.8	23.0	229	165	318	75.3	52.0	19.3	16.7
MAX	54	53	38	39	34	523	607	1620	157	108	28	35
MIN	22	33	19	19	19	21	59	104	38	24	13	10
AC-FT	1880	2410	1800	1590	1280	14050	9840	19540	4480	3200	1180	994
CFSM	.02	.03	.02	.02	.02	.17	.13	.24	.06	.04	.01	.01
IN.	.03	.03	.03	.02	.02	.20	.14	.28	.06	.05	.02	.01

CAL YR 1988 TOTAL 73258 MEAN 200 MAX 1630 MIN 14 AC-FT 145300 CFSM .15 IN. 2.08
WTR YR 1989 TOTAL 31381 MEAN 86.0 MAX 1620 MIN 10 AC-FT 62240 CFSM .07 IN. .89

05480500 DES MOINES RIVER AT FORT DODGE, IA

LOCATION.--Lat 42°30'22", long 94°12'04", in NW1/4 SW1/4 sec.19, T.89 N., R.28 W., Webster County, Hydrologic Unit 07100004, on right bank 400 ft upstream from Soldier Creek, 1,800 ft downstream from Illinois Central Railroad bridge in Fort Dodge, 2,000 ft downstream from Lizard Creek, and at mile 314.6.

DRAINAGE AREA.--4,190 mi^2.

PERIOD OF RECORD.--April 1905 to July 1906 (no winter records), October 1913 to September 1927 (published as "at Kalo"), October 1946 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1924, 1925 (M).

GAGE.--Water-stage recorder. Datum of gage is 969.38 ft above NGVD. See WSP 1728 for history of changes prior to Dec. 8, 1949.

REMARKS.--Estimated daily discharges: Nov. 30, Dec. 15-18, 24-29, Jan. 1, 2, 6-9, 26, 27, Feb. 1 to March 12, and May 24-30. Records good, except for estimated daily discharges, which are poor. Occasional minor regulation caused by dam 0.8 mi upstream from gage. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform and City of Fort Dodge gage-height telemeter at station.

AVERAGE DISCHARGE.--57 years (water years 1914-27, 1947-89), 1,543 ft^3/s, 5.00 in/yr, 1,118,000 acre-ft/yr; median of yearly mean discharges, 1,250 ft^3/s, 4.1 in/yr, 906,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,600 ft^3/s Apr. 8, 1965, gage height, 17.79 ft; maximum gage height, 19.62 ft, from floodmark, June 23, 1947, present site and datum; minimum daily discharge, 14 ft^3/s Nov. 3, 1955.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	----	*3130	*5.20				

Minimum discharge, 51 ft^3/s Sept. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	304	104	139	140	120	76	940	1020	441	213	136	71
2	265	108	192	135	102	80	778	911	395	215	123	65
3	217	104	173	128	90	96	681	768	612	190	115	63
4	185	110	154	120	96	94	601	692	463	157	110	132
5	169	142	157	248	94	95	544	641	382	141	109	128
6	157	175	160	230	100	98	507	587	337	132	111	107
7	150	114	148	225	109	88	489	556	329	124	96	136
8	145	107	113	220	120	85	504	546	426	121	89	317
9	141	112	121	200	115	130	474	532	318	115	86	227
10	136	109	116	176	110	210	453	519	289	110	84	181
11	120	100	101	145	108	320	439	516	269	235	81	144
12	111	126	108	134	104	500	357	517	276	295	79	119
13	110	137	116	111	98	1830	404	515	266	266	83	107
14	112	131	137	105	94	1490	389	507	248	220	127	98
15	113	149	100	105	90	1080	368	493	231	206	115	90
16	114	212	105	104	84	916	357	456	222	184	96	84
17	124	189	110	102	86	966	349	409	210	163	87	79
18	129	187	118	105	90	602	335	398	207	261	83	75
19	120	191	107	109	86	696	321	413	195	275	80	71
20	114	186	194	125	95	634	315	356	180	254	80	69
21	113	128	162	149	98	671	311	316	160	240	76	66
22	114	202	183	122	94	616	387	304	182	230	75	66
23	109	205	221	125	96	590	435	320	183	216	74	59
24	117	208	200	124	102	712	417	1760	169	204	68	55
25	110	204	150	121	100	887	550	2960	196	197	64	56
26	109	212	160	115	98	1030	565	1830	260	179	78	54
27	103	232	130	130	90	1170	576	1060	375	157	78	56
28	107	145	120	129	80	1340	721	812	318	145	78	56
29	96	141	130	125	---	1220	941	690	265	161	82	58
30	92	135	149	138	---	1220	991	602	228	173	81	56
31	99	---	151	177	---	1150	---	503	---	144	76	---
TOTAL	4205	4605	4425	4422	2749	20692	15499	22509	8632	5923	2800	2945
MEAN	136	153	143	143	98.2	667	517	726	288	191	90.3	98.2
MAX	304	232	221	248	120	1830	991	2960	612	295	136	317
MIN	92	100	100	102	80	76	311	304	160	110	64	54
AC-FT	8340	9130	8780	8770	5450	41040	30740	44650	17120	11750	5550	5840
CFSM	.03	.04	.03	.03	.02	.16	.12	.17	.07	.05	.02	.02
IN.	.04	.04	.04	.04	.02	.18	.14	.20	.08	.05	.02	.03

CAL YR 1988 TOTAL 237164 MEAN 648 MAX 4050 MIN 73 AC-FT 470400 CFSM .15 IN. 2.11
WTR YR 1989 TOTAL 99406 MEAN 272 MAX 2960 MIN 54 AC-FT 197200 CFSM .06 IN. .88

05481000 BOONE RIVER NEAR WEBSTER CITY, IA

LOCATION.--Lat 42°26'01", long 93°48'12", in NW1/4 SE1/4 sec. 18, T.88 N., R.25 W., Hamilton County, Hydrologic Unit 07100005, on right bank 100 ft upstream from bridge on State Highway 17, 2.5 mi south of Webster City, and 3.2 mi downstream from Brewers Creek.

DRAINAGE AREA.--844 mi^2.

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1308: 1940 (M), WSP 1708: 1956.

GAGE.--Water-stage recorder. Datum of gage is 989.57 ft above NGVD. Prior to June 26, 1940, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 1 to Mar. 22, June 30 to July 2, July 7-11, 17, 23-25, 30, 31, Aug. 3, 4, 14, 22, and Aug. 26-30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and gage-height satellite data collection platform at station.

AVERAGE DISCHARGE.--49 years, 409 ft^3/s, 6.58 in/yr, 296,300 acre-ft/yr; median of yearly mean discharges, 340 ft^3/s, 5.5 in/yr, 246,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,300 ft^3/s June 22, 1954, gage height, 18.55 ft; no flow Feb. 7, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1896, 19.1 ft about June 10, 1918, from floodmarks, from information by local resident, discharge, 21,500 ft^3/s. Flood of June 18, 1932, reached a stage of 16.0 ft, discharge, 15,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	0330	*2,330	*5.91	No other peak greater than base discharge.			

Minimum discharge, 7.0 ft^3/s Oct. 11-15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	13	23	20	33	24	117	202	229	142	33	22
2	17	12	21	24	32	28	95	178	186	110	29	21
3	19	12	20	29	30	32	85	155	200	87	28	20
4	17	12	20	28	29	35	77	142	179	75	27	32
5	16	13	19	37	28	36	70	133	143	69	25	36
6	14	16	18	290	26	35	66	119	122	51	23	49
7	12	16	19	150	25	50	65	108	108	49	22	54
8	9.9	15	18	60	24	90	74	98	197	48	21	528
9	9.3	16	17	75	23	150	72	91	135	44	20	634
10	9.0	15	15	68	22	280	67	88	112	41	19	434
11	7.9	16	16	58	22	400	66	79	96	150	18	286
12	9.0	23	17	50	21	600	62	74	101	474	18	190
13	8.6	19	17	44	21	540	60	69	100	445	21	141
14	7.8	19	17	34	21	450	61	65	84	280	40	112
15	8.1	40	19	31	20	400	57	62	74	177	86	90
16	9.0	48	22	30	20	350	54	59	67	121	63	76
17	10	50	22	30	20	310	53	56	61	130	45	65
18	10	40	24	30	20	280	51	58	59	134	35	58
19	11	36	26	30	20	250	50	86	55	276	43	51
20	13	28	28	30	22	220	49	132	49	254	34	47
21	14	35	24	17	23	190	48	98	44	175	28	44
22	13	29	19	25	24	180	82	79	53	118	25	42
23	11	31	20	22	25	103	200	73	53	90	23	39
24	10	28	20	19	25	125	417	1060	49	70	21	38
25	11	25	20	20	25	194	443	1920	78	58	19	36
26	11	24	20	22	24	296	275	1150	211	48	25	35
27	13	24	19	21	25	417	199	646	413	44	31	35
28	16	27	19	20	25	416	199	416	347	39	29	33
29	17	24	19	24	---	326	182	310	242	39	27	33
30	15	25	18	28	---	218	190	392	155	51	25	34
31	15	---	18	35	---	152	---	312	---	47	24	---
TOTAL	384.6	731	614	1401	675	7177	3586	8510	4002	3936	927	3315
MEAN	12.4	24.4	19.8	45.2	24.1	232	120	275	133	127	29.9	110
MAX	21	50	28	290	33	600	443	1920	413	474	86	634
MIN	7.8	12	15	17	20	24	48	56	44	39	18	20
AC-FT	763	1450	1220	2780	1340	14240	7110	16880	7940	7810	1840	6580
CFSM	.01	.03	.02	.05	.03	.27	.14	.33	.16	.15	.04	.13
IN.	.02	.03	.03	.06	.03	.32	.16	.38	.18	.17	.04	.15

CAL YR 1988 TOTAL 52744.5 MEAN 144 MAX 887 MIN 2.9 AC-FT 104600 CFSM .17 IN. 2.32
WTR YR 1989 TOTAL 35258.6 MEAN 96.6 MAX 1920 MIN 7.8 AC-FT 69940 CFSM .11 IN. 1.55

05481300 DES MOINES RIVER NEAR STRATFORD, IA

LOCATION.--Lat 42°15'04", long 93°59'52", in NW1/4 NE1/4 sec.21, T.86 N., R.27 W., Webster County, Hydrologic Unit 07100004, on right bank 6 ft downstream from bridge on State Highway 175, 0.1 mi downstream from Skillet Creek, 4.0 mi southwest of Stratford, 7.3 mi downstream from Boone River and at mile 276.7.

DRAINAGE AREA.--5,452 mi^2.

PERIOD OF RECORD.--April 1920 to current year in reports of U.S. Geological Survey. Published as "near Boone" 1920-67. Monthly discharge only for some periods, published in WSP 1308. December 1904 to April 1920 (fragmentary gage heights during high-water periods only) in reports of U.S. Weather Bureau.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1925-27, 1934. WSP 1708: 1955.

GAGE.--Water-stage recorder. Datum of gage is 894.00 ft above NGVD. Prior to May 1, 1920, nonrecording gage 16.6 mi downstream at datum 23.49 ft lower. Oct. 9, 1924, to Jan. 10, 1933, nonrecording gage 17.6 mi downstream at datum 28.53 ft lower. Jan. 11, 1933, to Sept. 30, 1934, nonrecording gage 17.9 mi downstream at datum 22.25 ft lower. Oct. 1, 1934 to Feb. 6, 1935, nonrecording gage and Feb. 7, 1935 to Sept. 30, 1967, water-stage recorder 17.9 mi downstream at datum 21.84 ft lower.

REMARKS.--Estimated daily discharges: Nov. 28 to Mar. 24. Records excellent except those for estimated daily discharges, which are poor. Occasional minor regulation caused by dam at Fort Dodge. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--69 years, 1,964 ft^3/s, 4.89 in/yr, 1,423,000 acre-ft/yr; median of yearly mean discharges, 1,630 ft^3/s, 4.1 in/yr, 1,180,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57,400 ft^3/s June 22, 1954, gage height, 25.35 ft, from graph based on hourly gage readings, site and datum then in use; no flow for a short time on Jan. 9, 25, 1938, caused by manipulation of gates in control dam, site then in use; minimum unregulated daily discharge, 13 ft^3/s Jan. 23, 24, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 30, 1903, reached a stage of 25.4 ft, from high-water mark, site and datum then in use, discharge, 43,600 ft^3/s. Flood of June 22, 1954, reached a stage of 29.7 ft, from floodmark, present site and datum, discharge, 54,200 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 25	1615	*5,930	*10.46				

Minimum discharge, 101 ft^3/s Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	302	109	200	220	180	145	1420	1300	968	613	210	114
2	310	114	210	215	175	140	1180	1300	815	494	199	108
3	276	117	210	210	170	140	1020	1170	3220	422	187	103
4	230	123	200	200	150	145	896	1020	1960	372	172	135
5	207	121	195	195	150	150	805	936	1260	329	160	201
6	185	132	190	350	145	150	726	846	937	288	157	188
7	169	196	185	900	145	145	684	770	753	252	151	200
8	159	147	200	680	145	140	697	714	1680	225	145	345
9	153	130	220	500	145	200	681	669	1290	210	137	1370
10	143	129	270	390	145	320	641	621	904	190	129	1090
11	137	130	260	340	145	700	610	573	709	863	123	789
12	130	146	245	280	140	1600	586	524	601	1610	121	573
13	119	171	235	250	140	1400	513	486	563	1630	118	446
14	117	172	225	230	140	1350	529	456	516	1110	122	371
15	118	184	220	220	150	1300	523	431	460	815	132	324
16	118	290	200	215	145	1200	505	413	412	614	188	283
17	128	315	210	210	140	1100	479	397	373	490	190	247
18	134	292	210	200	140	1000	459	386	327	481	160	219
19	135	261	210	195	145	880	437	445	301	655	157	196
20	135	261	210	185	145	950	422	470	272	791	155	176
21	127	234	215	180	145	900	394	461	242	681	140	162
22	125	209	225	180	150	850	481	400	247	550	131	148
23	120	265	215	175	145	920	1030	402	279	462	136	139
24	118	273	240	170	145	1020	916	1800	248	398	121	135
25	116	264	250	170	140	1150	1000	5350	373	351	118	122
26	120	265	240	170	140	1340	1000	4430	573	321	129	112
27	116	270	240	170	140	1610	898	2630	854	280	145	114
28	114	215	260	165	145	1810	985	1750	1000	244	136	113
29	113	210	250	165	---	1870	1120	1350	950	231	127	108
30	124	200	230	170	---	1650	1240	1240	784	253	125	105
31	111	---	220	175	---	1570	---	1200	---	244	124	---
TOTAL	4709	5945	6890	8075	4130	27845	22877	34940	23871	16469	4545	8736
MEAN	152	198	222	260	147	898	763	1127	796	531	147	291
MAX	310	315	270	900	180	1870	1420	5350	3220	1630	210	1370
MIN	111	109	185	165	140	140	394	386	242	190	118	103
AC-FT	9340	11790	13670	16020	8190	55230	45380	69300	47350	32670	9020	17330
CFSM	.03	.04	.04	.05	.03	.16	.14	.21	.15	.10	.03	.05
IN.	.03	.04	.05	.06	.03	.19	.16	.24	.16	.11	.03	.06

CAL YR 1988 TOTAL 309527 MEAN 846 MAX 4810 MIN 83 AC-FT 613900 CFSM .16 IN. 2.11
WTR YR 1989 TOTAL 169032 MEAN 463 MAX 5350 MIN 103 AC-FT 335300 CFSM .08 IN. 1.15

05481630 SAYLORVILLE LAKE NEAR SAYLORVILLE, IA

LOCATION.--Lat 41°42'13", long 93°41'21", in SE 1/4, SW 1/4 sec.30, T.80 N., R.24 W., Polk County, Hydrologic Unit 07100004, in control tower of Saylorville Dam, 3.2 mi northwest of Saylorville, 4.2 mi upstream from Beaver Creek, and at mile 213.7.

DRAINAGE AREA.--5,823 mi^2.

PERIOD OF RECORD.--April 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1976. Storage began in April 1977. Release controlled at intake structure to forechamber of 22 ft diameter concrete conduit through dam. Ungated chute spillway 430 ft in length at right end of dam at elevation 884 ft, contents, 570,000 acre-ft. Conservation pool at elevation 833 ft, contents, 74,000 acre-ft, surface area, 5,400 acres. Flood pool elevation at 890 ft, contents, 676,000 acre-ft, surface area, 16,700 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 655,000 acre-ft June 22, 1984; maximum elevation, 889.25 ft June 22, 1984; minimum daily contents, 45,000 acre-ft May 15, 1985; minimum elevation, 832.61 ft Jan. 19, 1979.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 109,000 acre-ft May 26; maximum elevation, 839.10 May 26, 27; minimum daily contents, 69,100 acre-ft Feb. 28; minimum elevation, 832.2 ft March 8, 9.

Capacity table (elevation, in feet, and contents, in acre-feet)

805	360	833	74,000	884	570,000
810	2,300	840	116,000	890	676,000
815	7,700	850	190,000	900	938,000
820	19,000	860	278,000	910	1,320,000
830	58,600	880	511,000	915	1,530,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79700	74300	74200	71700	74400	70700	91900	106000	104000	106000	105000	102000
2	79400	74000	74000	71500	73900	70500	90900	106000	104000	106000	105000	101000
3	79700	73900	74200	71400	73700	70500	90800	106000	105000	106000	106000	101000
4	79500	74000	74000	71300	73800	70400	90400	105000	108000	106000	106000	101000
5	79300	74300	74200	71500	73700	70100	90200	105000	107000	105000	106000	101000
6	79300	73400	74200	71500	73800	69800	90500	104000	105000	106000	105000	101000
7	79200	73200	74500	71500	73800	69500	91000	104000	105000	105000	105000	102000
8	79100	73000	74200	71900	73900	69400	91800	105000	105000	105000	105000	103000
9	79100	73200	74000	72700	73800	69600	92600	105000	107000	105000	105000	103000
10	79100	73100	73700	73300	73800	70700	93000	105000	107000	105000	104000	104000
11	78800	72300	73400	73600	73700	72400	93700	105000	106000	106000	104000	105000
12	78700	72600	73200	73700	73600	75500	93800	105000	105000	106000	104000	105000
13	78300	72600	73100	73800	73600	79800	93600	104000	105000	108000	104000	105000
14	78200	72300	72900	73900	73400	84500	93400	104000	104000	107000	104000	105000
15	78300	73200	72700	73900	73300	87700	92800	104000	104000	106000	103000	105000
16	77800	73100	72600	73900	73100	90000	92900	104000	104000	106000	103000	104000
17	77800	73100	72600	73800	72900	90500	92800	103000	105000	106000	103000	104000
18	77500	73300	72600	73800	72700	89800	93400	104000	105000	107000	103000	104000
19	77200	73700	72600	73900	72600	90500	93800	105000	105000	107000	103000	104000
20	77200	73600	71800	73700	72400	91900	94300	104000	104000	106000	103000	104000
21	77000	73500	71600	73600	72300	92300	94700	105000	105000	106000	103000	104000
22	76800	73500	71600	73600	72000	92000	95000	105000	104000	105000	102000	104000
23	76800	73600	71700	73500	71700	92100	95900	105000	105000	105000	103000	103000
24	76400	73800	71900	73500	71500	93000	97700	108000	105000	105000	103000	103000
25	76200	73800	71800	73600	71100	93000	99200	107000	106000	105000	102000	103000
26	75500	74300	71900	73500	70000	93000	101000	109000	106000	105000	103000	102000
27	75700	74700	71800	73400	69400	93400	103000	107000	107000	105000	102000	102000
28	75300	74100	71800	73700	69100	93800	104000	105000	108000	105000	102000	102000
29	75200	74300	71700	73700	---	93600	105000	104000	107000	105000	102000	102000
30	74600	74400	71800	73900	---	93500	105000	104000	107000	105000	102000	101000
31	74500	---	71700	74500	---	92400	---	104000	---	105000	102000	---
MEAN	77700	73500	72800	73100	72700	83100	94900	105000	105000	106000	104000	103000
MAX	79700	74700	74500	74500	74400	93800	105000	109000	108000	108000	106000	105000
MIN	74500	72300	71600	71300	69100	69400	90200	103000	104000	105000	102000	101000

CAL YR 1988 MEAN 86600 MAX 96300 MIN 71600
WTR YR 1989 MEAN 89300 MAX 109000 MIN 69100

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA

LOCATION.--Lat 41°40'50", long 93°40'05", near center of sec.5, T.79 N., R.24 W., Polk County, Hydrologic Unit 07100004, on left bank 5 ft upstream of Fisher Bridge on county highway R6F, 2.0 mi west of Saylorville, 2.1 mi downstream from Rock Creek, 2.3 mi downstream from Saylorville Dam, 2.3 mi upstream from Beaver Creek, and at mile 211.4.

DRAINAGE AREA.--5,841 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage recorder. Datum of gage is 787.42 ft above NGVD (levels by U. S. Army Corps of Engineers). Prior to Aug. 6, 1970, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by Saylorville Lake (Station 05481630) 2.3 mi upstream since Apr. 12, 1977. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--28 years, 2,792 ft^3/s, 6.49 in/yr, 2,021,000 acre-ft/yr; median of yearly mean discharges, 2,280 ft^3/s, 5.3 in/yr, 1,650,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 47,400 ft^3/s Apr. 10, 1965, gage height, 24.02 ft; minimum daily discharge, 13 ft^3/s Jan. 25, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1893, 24.5 ft June 24, 1954, from floodmarks, discharge, 60,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,700 ft^3/s May 27, gage height, 8.66 ft; minimum daily discharge, 198 ft^3/s July 11 and Aug. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	239	219	219	219	204	201	1770	905	1400	996	198	207
2	239	221	221	219	229	201	1780	1390	1070	834	212	206
3	235	222	222	211	401	206	1430	1580	1080	613	218	209
4	236	222	222	211	370	205	1230	1580	1470	554	216	209
5	326	213	222	215	367	256	974	1280	2330	363	223	206
6	217	212	222	215	351	222	758	1090	2300	286	215	206
7	219	217	222	211	334	210	570	856	1320	296	223	211
8	214	216	222	290	326	210	397	691	1000	264	226	223
9	215	238	222	216	336	219	396	687	980	234	228	447
10	215	254	224	207	339	225	400	687	1250	223	216	552
11	217	228	232	203	333	217	405	692	1400	198	206	547
12	219	230	226	206	300	215	566	690	1190	503	207	542
13	218	230	226	206	283	218	679	691	953	966	202	543
14	216	230	223	208	253	380	675	694	732	1560	203	542
15	213	235	256	210	238	805	676	619	476	1630	203	540
16	215	226	225	210	234	1180	681	566	413	1080	207	449
17	214	228	222	210	225	1180	510	566	404	693	212	373
18	213	230	222	210	219	1040	249	469	402	743	212	286
19	215	230	221	208	215	657	249	406	403	829	213	206
20	215	225	219	206	207	456	251	403	406	826	214	207
21	214	225	219	207	204	839	251	404	358	822	212	206
22	212	224	220	206	221	1160	241	407	279	820	211	204
23	208	223	215	206	214	963	241	407	249	667	212	201
24	205	223	218	206	201	814	241	1300	249	520	210	200
25	210	223	215	206	201	1040	245	2950	248	520	210	201
26	221	226	217	206	198	1240	249	4340	408	403	213	199
27	221	216	217	206	207	1240	383	4670	627	205	206	200
28	222	217	215	206	205	1570	653	3760	1100	287	206	201
29	222	219	218	206	---	1890	773	2560	1320	237	219	201
30	222	219	221	206	---	1980	776	1690	1100	200	211	200
31	221	---	219	206	---	1840	---	1420	---	200	210	---
TOTAL	6889	6741	6884	6558	7415	23079	18699	40450	26917	18572	6574	8924
MEAN	222	225	222	212	265	744	623	1305	897	599	212	297
MAX	326	254	256	290	401	1980	1780	4670	2330	1630	228	552
MIN	206	212	215	203	198	201	241	403	248	198	198	199
AC-FT	13660	13370	13650	13010	14710	45780	37090	80230	53390	36840	13040	17700

CAL YR 1988	TOTAL 330875	MEAN 904	MAX 4580	MIN 172	AC-FT 656300
WTR YR 1989	TOTAL 177702	MEAN 487	MAX 4670	MIN 198	AC-FT 352500

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD: Water years 1962 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: December 1967 to September 1971, October 1971 to September 1980 (partial record station), October 1980 to current year.
WATER TEMPERATURES: October 1961 to September 1971, October 1971 to September 1980 (partial record station), October 1980 to current year.
SUSPENDED-SEDIMENT DISCHARGE: October 1961 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. During periods of partial ice cover, sediment samples are collected in open water channel.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 1,400 microsiemens Feb. 18, 1977; minimum daily, 90 microsiemens Feb. 19, 1971.
WATER TEMPERATURES: Maximum daily, 36.0°C June 29, 1971; minimum daily, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 5,400 mg/L May 14, 1970; minimum daily mean, 1 mg/L Jan. 8, 1965, Sept. 1, 1988.
SEDIMENT LOADS: Maximum daily, 148,000 tons June 12, 1966; minimum daily, 0.56 ton Sept. 1, 1988.

EXTREMES FOR CURRENT YEAR:
SPECIFIC CONDUCTANCE: Maximum daily, 935 microsiemens Mar. 7; minimum daily, 506 microsiemens Aug. 23.
WATER TEMPERATURES: Maximum daily, 29.0°C Jul. 28-30; minimum daily, 0.0°C Feb. 2, 4, 6, 8.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 429 mg/L May 24; minimum daily mean, 2 mg/L Jan. 10, 11, Feb. 6.
SEDIMENT LOADS: Maximum daily, 1,020 tons May 24; minimum daily, 1.1 tons Jan. 10, 11.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	788	630	---	587	---	520	539
2	---	---	690	735	750	---	---	624	585	555	540	---
3	---	---	---	---	---	---	627	---	---	---	528	530
4	645	---	---	690	750	850	633	---	590	---	518	544
5	650	690	720	---	---	---	623	617	605	550	528	546
6	680	690	---	690	755	---	630	---	---	552	520	544
7	670	670	700	---	---	935	633	---	---	580	523	526
8	675	---	---	---	755	---	614	624	606	560	525	545
9	---	---	700	690	---	790	---	639	602	---	522	---
10	690	---	---	---	---	849	610	---	---	535	523	540
11	685	690	700	700	---	847	---	630	610	537	525	---
12	685	---	---	---	---	827	614	---	605	544	525	552
13	695	660	723	---	---	825	615	---	603	538	525	548
14	695	---	653	---	---	832	---	623	604	537	535	550
15	685	---	690	---	750	844	604	---	600	---	533	553
16	675	---	700	730	---	780	578	---	601	531	544	---
17	685	---	---	---	---	904	616	---	---	525	532	---
18	690	655	---	740	---	808	587	---	---	535	520	---
19	695	---	---	---	763	---	---	---	611	503	520	540
20	700	660	715	---	---	908	591	---	---	532	---	---
21	---	---	---	730	---	680	615	---	600	530	524	552
22	700	---	---	---	793	662	---	---	---	---	530	560
23	705	670	720	720	797	642	591	---	---	509	506	553
24	705	---	---	---	---	650	---	550	---	520	509	560
25	705	---	---	---	---	---	592	621	---	539	523	565
26	725	680	720	740	840	667	---	624	540	---	528	566
27	700	---	730	700	---	667	---	618	548	---	---	573
28	---	---	---	---	---	673	613	620	562	537	529	566
29	695	---	---	750	---	673	---	---	518	546	528	568
30	---	690	740	---	---	670	---	588	560	538	538	565
31	---	---	---	---	---	631	---	615	---	---	546	---

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	2.0	2.0	---	17.0	---	28.0	26.0
2	---	---	8.0	3.0	.0	---	---	10.0	19.0	24.0	28.0	---
3	---	---	---	---	---	---	2.0	---	---	---	26.0	26.0
4	19.0	---	---	2.0	.0	3.0	2.0	---	20.0	---	26.0	25.0
5	19.0	13.0	8.0	---	---	---	2.0	10.0	22.0	26.0	26.0	25.0
6	19.0	13.0	---	4.0	.0	---	2.0	---	---	26.0	26.0	24.0
7	20.0	6.0	6.0	---	---	3.0	3.0	---	---	27.0	21.0	24.0
8	20.0	---	---	---	.0	---	5.0	11.0	22.0	26.0	26.0	24.0
9	20.0	---	5.0	4.0	---	3.0	---	11.0	22.0	---	26.0	---
10	---	---	---	---	---	7.0	7.0	---	---	26.0	26.0	23.0
11	20.0	13.0	4.0	4.0	---	3.0	---	11.0	23.0	26.0	26.0	---
12	20.0	---	---	---	---	3.0	7.0	---	23.0	27.0	26.0	22.0
13	20.0	13.0	3.0	---	---	4.0	7.0	---	24.0	27.0	26.0	22.0
14	20.0	---	2.0	3.0	---	4.0	---	10.0	24.0	27.0	26.0	22.0
15	20.0	10.0	3.0	---	2.0	4.0	10.0	---	24.0	---	26.0	22.0
16	20.0	---	---	---	---	4.0	14.0	---	25.0	27.0	25.0	---
17	19.0	---	3.0	---	---	---	10.0	---	---	28.0	26.0	---
18	15.0	9.0	---	4.0	---	4.0	14.0	---	---	28.0	26.0	---
19	15.0	---	---	---	2.0	---	---	---	26.0	28.0	26.0	20.0
20	14.0	8.0	2.0	---	---	5.0	10.0	---	---	28.0	---	---
21	---	---	---	5.0	---	5.0	10.0	---	26.0	28.0	26.0	20.0
22	13.0	---	---	---	2.0	5.0	---	---	---	---	26.0	20.0
23	12.0	8.0	2.0	5.0	2.0	5.0	15.0	---	---	28.0	26.0	20.0
24	10.0	---	---	---	---	5.0	---	19.0	---	28.0	26.0	20.0
25	10.0	---	---	---	---	---	20.0	12.0	---	28.0	26.0	21.0
26	10.0	8.0	2.0	4.0	2.0	6.0	---	11.0	21.0	---	26.0	21.0
27	10.0	---	---	3.0	---	6.0	---	14.0	24.0	---	---	21.0
28	---	---	3.0	---	---	4.0	10.0	14.0	24.0	29.0	26.0	21.0
29	9.0	---	---	4.0	---	4.0	---	---	24.0	29.0	26.0	21.0
30	---	8.0	3.0	---	---	3.0	---	16.0	24.0	29.0	26.0	21.0
31	---	---	---	3.0	---	3.0	---	16.0	---	---	26.0	---

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	6	3.9	9	5.3	7	4.1	3	1.8	3	1.7	10	5.4
2	5	3.2	10	6.0	7	4.2	3	1.8	4	2.5	10	5.4
3	6	3.8	9	5.4	7	4.2	4	2.3	6	6.5	50	28
4	5	3.2	9	5.4	8	4.8	4	2.3	4	4.0	28	15
5	14	12	8	4.6	9	5.4	4	2.3	3	3.0	7	4.8
6	7	4.1	7	4.0	7	4.2	3	1.7	2	1.9	5	3.0
7	6	3.5	10	5.9	5	3.0	4	2.3	4	3.6	7	4.0
8	5	2.9	15	8.7	6	3.6	15	12	3	2.6	8	4.5
9	6	3.5	19	12	7	4.2	3	1.7	3	2.7	12	7.1
10	7	4.1	17	12	7	4.2	2	1.1	3	2.7	15	9.1
11	12	7.0	7	4.3	6	3.8	2	1.1	3	2.7	24	14
12	14	8.3	7	4.3	6	3.7	3	1.7	4	3.2	20	12
13	14	8.2	6	3.7	9	5.5	3	1.7	5	3.8	13	7.7
14	13	7.6	6	3.7	11	6.6	3	1.7	7	4.8	16	16
15	14	8.1	9	5.7	10	6.9	3	1.7	7	4.5	25	54
16	18	10	10	6.1	5	3.0	3	1.7	9	5.7	34	108
17	28	16	10	6.2	3	1.8	3	1.7	10	6.1	10	32
18	25	14	4	2.5	3	1.8	3	1.7	18	11	20	56
19	18	10	11	6.8	3	1.8	4	2.2	19	11	84	149
20	8	4.6	13	7.9	3	1.8	4	2.2	45	25	79	97
21	6	3.5	13	7.9	4	2.4	4	2.2	9	5.0	12	27
22	3	1.7	13	7.9	5	3.0	4	2.2	12	7.2	10	31
23	6	3.4	10	6.0	6	3.5	3	1.7	20	12	7	18
24	8	4.4	7	4.2	5	2.9	4	2.2	15	8.1	7	15
25	8	4.5	7	4.2	4	2.3	4	2.2	7	3.8	7	20
26	8	4.8	7	4.3	3	1.8	4	2.2	9	4.8	8	27
27	8	4.8	7	4.1	3	1.8	9	5.0	10	5.6	8	27
28	8	4.8	7	4.1	3	1.7	5	2.8	10	5.5	11	47
29	9	5.4	7	4.1	3	1.8	4	2.2	---	---	13	66
30	7	4.2	7	4.1	3	1.8	3	1.7	---	---	18	96
31	9	5.4	---	---	3	1.8	3	1.7	---	---	18	89
TOTAL	---	184.9	---	171.4	---	103.4	---	72.8	---	161.0	---	1095.0

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IA--Continued

WATER-QUALITY RECORDS

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN-TRATION (MG/L)	LOAD (TONS/ DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	21	100	36	88	29	110	41	110	18	9.6	8	4.5
2	22	106	30	113	28	81	39	88	15	8.6	8	4.4
3	21	81	26	111	28	82	25	41	15	8.8	13	7.3
4	20	66	26	111	27	107	18	27	24	14	10	5.6
5	27	71	27	93	23	145	17	17	14	8.4	12	6.7
6	21	43	26	77	21	130	11	8.5	7	4.1	15	8.3
7	21	32	26	60	20	71	8	6.4	8	4.8	13	7.4
8	16	17	33	62	21	57	13	9.3	10	6.1	13	7.8
9	12	13	30	56	21	56	16	10	7	4.3	12	14
10	12	13	30	56	21	71	16	9.6	11	6.4	12	18
11	10	11	31	58	21	79	16	8.6	12	6.7	11	16
12	14	21	30	56	24	77	17	23	12	6.7	11	16
13	15	27	36	67	21	54	12	31	11	6.0	10	15
14	15	27	40	75	30	59	17	72	9	4.9	13	19
15	15	27	15	25	41	53	20	88	7	3.8	7	10
16	16	29	5	7.6	38	42	37	108	11	6.1	8	9.7
17	17	23	6	9.2	36	39	24	45	7	4.0	8	8.1
18	19	13	4	5.1	35	38	17	34	11	6.3	9	6.9
19	20	13	5	5.5	37	40	15	34	11	6.3	9	5.0
20	35	24	5	5.4	36	39	14	31	10	5.8	9	5.0
21	46	31	5	5.5	34	33	14	31	11	6.3	9	5.0
22	30	20	5	5.5	33	25	13	29	13	7.4	11	6.1
23	23	15	5	5.5	30	20	14	25	10	5.7	9	4.9
24	17	11	429	1020	30	20	13	18	9	5.1	8	4.3
25	14	9.3	6	48	30	20	13	18	11	6.2	10	5.4
26	14	9.4	5	59	43	47	13	14	9	5.2	8	4.3
27	19	20	4	50	46	78	13	7.2	9	5.0	12	6.5
28	25	44	11	112	44	131	13	10	8	4.4	10	5.4
29	26	54	26	180	44	157	13	8.3	9	5.3	8	4.3
30	28	59	32	146	42	125	15	8.1	8	4.6	8	4.3
31	---	---	31	119	---	---	16	8.6	11	6.2	---	---
TOTAL	---	1029.7	---	2891.3	---	2086	---	978.6	---	193.1	---	245.2
YEAR		9212.4										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	TEMPER-ATURE WATER (DEG C) (00010)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV						
07...	1130	6.0	216	14	8.2	99
JAN						
27...	1235	3.0	205	8	4.4	72
APR						
20...	1215	10.0	244	20	13	94
JUL						
07...	1245	27.0	246	10	6.6	88

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAM-PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)
NOV											
07...	1130	3	0	2	12	42	61	78	92	98	100

05481950 BEAVER CREEK NEAR GRIMES, IA

LOCATION.--Lat 41°41'18", long 93°44'08", in SW1/4 SW1/4 sec.35, T.80 N., R.25 W., Polk County, Hydrologic Unit 07100004, on right bank 6 ft upstream from bridge on Northwest 70th Avenue, 0.5 mi downstream from Little Beaver Creek, 2.5 mi east of Grimes and 6 mi upstream from mouth.

DRAINAGE AREA.--358 mi^2.

PERIOD OF RECORD.--April 1960 to current year.

REVISED RECORDS.--WDR IA-77-1: 1974 (P).

GAGE.--Water-stage recorder and concrete and steel sheeting broad-crested control. Datum of gage is 806.98 ft above NGVD. Prior to Aug. 31, 1966, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Dec. 2 to Mar. 16, and Mar. 18-20. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--29 years, 205 ft^3/s, 7.78 in/yr, 148,500 acre-ft/yr; median of yearly mean discharges, 200 ft^3/s, 7.6 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,980 ft^3/s June 30, 1986, gage height, 14.73 ft; no flow for several days in 1970 and 1971 and many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 1	1800	*1,540	(a) *11.35	No other peak greater than base discharge.			

(a) Ice jam
Minimum discharge, 0.02 ft^3/s Nov. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.18	.04	2.6	.35	78	1.3	7.0	21	44	58	3.0	2.0
2	.07	.06	2.3	.60	50	3.5	6.8	17	36	44	1.5	1.3
3	.04	.14	2.2	.52	40	2.5	7.4	14	96	35	1.6	.88
4	.06	.20	1.9	.47	36	1.9	9.0	13	73	28	1.7	2.4
5	.11	.18	1.9	.45	52	2.4	7.5	11	97	21	1.5	2.4
6	.09	.20	2.1	.58	10	2.0	7.4	8.7	90	16	1.6	2.3
7	.13	.16	2.5	.70	2.0	1.9	7.2	7.6	61	12	.56	3.7
8	.09	.16	2.7	.90	10	7.0	9.1	7.2	97	9.7	.32	6.0
9	.07	.19	1.4	1.2	70	15	7.4	8.5	99	7.4	.20	72
10	.05	.15	1.6	1.0	37	45	6.5	5.6	79	5.8	.18	48
11	.04	.16	1.5	.76	20	100	6.8	4.7	65	16	.14	40
12	.06	.41	1.0	.60	10	86	5.9	5.1	50	21	.12	34
13	.04	.28	.50	.70	5.0	74	4.4	3.6	40	6.3	.07	25
14	.03	.22	.60	.88	2.0	72	4.8	3.4	33	4.6	.05	19
15	.04	1.1	2.5	1.0	1.1	50	4.1	3.2	29	4.6	.05	15
16	.03	1.8	.80	1.1	1.4	45	4.1	3.3	24	3.8	.12	11
17	.04	1.2	.40	1.1	1.8	24	4.2	2.4	21	3.1	.14	8.5
18	.04	1.3	.58	1.2	2.5	27	4.0	4.0	20	204	.14	7.4
19	.04	1.5	.52	1.0	2.3	33	4.0	4.6	17	204	.32	6.0
20	.10	2.3	.60	.50	2.0	32	3.7	3.3	14	84	.22	4.8
21	.11	1.9	.64	.40	2.2	25	3.5	13	11	46	.20	4.0
22	.04	2.3	.73	.35	2.4	25	3.4	35	9.7	31	.21	3.4
23	.04	2.7	.60	.27	2.2	18	3.7	20	10	22	.95	2.6
24	.03	2.9	.42	.23	1.9	16	3.8	521	9.4	17	.80	2.0
25	.03	2.2	.76	.20	1.7	19	4.0	548	49	13	.66	1.9
26	.04	3.4	1.3	.21	1.8	16	3.9	302	91	10	1.1	2.2
27	.04	3.6	1.9	.21	2.0	13	4.8	179	68	7.3	2.2	1.6
28	.03	2.6	3.0	.35	2.3	10	14	117	80	6.0	1.9	1.2
29	.03	1.7	1.4	.50	---	9.2	6.9	90	103	5.3	4.0	1.1
30	.04	3.2	.60	.78	---	8.0	7.8	75	80	5.4	3.9	.95
31	.03	---	.23	1.1	---	7.6	---	57	---	4.0	2.7	---
TOTAL	1.81	38.25	41.78	20.21	449.6	792.3	177.1	2108.2	1596.1	955.3	32.15	332.63
MEAN	.058	1.27	1.35	.65	16.1	25.6	5.90	68.0	53.2	30.8	1.04	11.1
MAX	.18	3.6	3.0	1.2	78	100	14	548	103	204	4.0	72
MIN	.03	.04	.23	.20	1.1	1.3	3.4	2.4	9.4	3.1	.05	.88
AC-FT	3.6	76	83	40	892	1570	351	4180	3170	1890	64	660
CFSM	.00	.00	.00	.00	.04	.07	.02	.19	.15	.09	.00	.03
IN.	.00	.00	.00	.00	.05	.08	.02	.22	.17	.10	.00	.03

CAL YR 1988 TOTAL 15577.18 MEAN 42.6 MAX 430 MIN .01 AC-FT 30900 CFSM .12 IN. 1.62
WTR YR 1989 TOTAL 6545.43 MEAN 17.9 MAX 548 MIN .03 AC-FT 12980 CFSM .05 IN. .68

05482135 NORTH RACCOON RIVER NEAR NEWELL, IA

LOCATION.--Lat 42°36'16", long 95°02'42", in NE1/4 NW1/4 sec.24, T.90 N., R.36 W., Buena Vista County, Hydrologic Unit 07100005, on left bank 40 ft downstream from bridge on State Highway 7, 0.8 mi upstream from Outlet Creek, 2.2 mi west of Newell, and at mile 398.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--233 mi^2.

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1235.50 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 20-22, Nov. 28 to Dec. 2, Dec. 10-13, and Dec. 16 to Mar. 24. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Geological Survey gage-height telemeter at station.

AVERAGE DISCHARGE.--7 years, 175 ft^3/s, 10.2 in/yr, 126,800 acre-ft/yr; median of yearly mean discharge 150 ft^{3}s, 8.7 in/yr, 109,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,850 ft^3/s June 17, 1984, gage height, 16.73 ft, from floodmark; minimum discharge 1.0 ft^3/s Aug. 24, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 750 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar 10	0630	ice jam	*13.90	May 24	1015	*504	11.50

Minimum daily discharge, 1.0 ft^3/s Aug. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	108	18	47	39	26	12	47	74	60	37	4.0	1.2
2	84	17	60	32	20	12	46	69	55	28	3.5	1.3
3	69	18	72	31	16	13	46	63	49	23	3.3	7.0
4	53	19	54	30	13	14	41	63	43	18	3.1	24
5	47	20	69	34	14	15	37	54	40	15	3.2	22
6	43	16	67	70	14	15	39	45	37	13	3.1	15
7	39	18	59	55	14	19	41	43	33	11	2.9	22
8	37	17	44	37	14	23	55	42	30	10	2.5	50
9	35	16	73	30	13	29	58	36	27	9.2	2.4	51
10	32	16	60	29	13	270	53	32	24	7.7	2.1	35
11	29	13	52	28	13	230	56	31	23	7.6	2.0	32
12	27	22	60	27	14	120	51	30	27	8.6	1.9	29
13	27	24	76	26	14	80	50	31	23	7.6	1.9	27
14	28	22	82	26	14	60	51	30	21	6.7	2.3	22
15	27	24	55	26	13	58	47	26	20	7.1	2.9	25
16	25	82	60	25	12	56	51	25	18	6.8	2.0	22
17	24	59	68	25	11	48	47	24	17	5.9	2.1	23
18	24	60	72	25	11	45	46	25	19	13	1.4	21
19	22	64	80	25	11	42	48	29	15	8.8	1.3	21
20	23	55	98	26	10	40	47	23	13	5.9	1.5	15
21	24	58	100	24	11	41	44	20	13	4.4	1.2	9.7
22	21	60	90	23	10	42	40	21	30	4.0	1.3	8.6
23	22	62	98	23	9.0	45	40	28	32	4.0	1.1	5.1
24	20	69	90	21	11	56	37	404	25	3.8	1.0	5.9
25	19	70	68	19	12	67	35	266	41	3.5	1.1	5.6
26	19	63	66	18	15	65	32	164	94	3.3	1.7	5.3
27	20	64	60	17	15	67	32	124	125	3.1	3.7	5.5
28	18	62	52	19	14	64	66	108	89	2.9	2.2	5.3
29	17	52	46	18	---	57	91	98	65	7.1	1.6	4.6
30	16	54	44	19	---	55	84	80	47	12	1.4	4.8
31	18	---	42	27	---	49	---	66	---	5.3	1.5	---
TOTAL	1017	1214	2064	874	377.0	1809	1458	2174	1155	303.3	67.2	525.9
MEAN	32.8	40.5	66.6	28.2	13.5	58.4	48.6	70.1	38.5	9.78	2.17	17.5
MAX	108	82	100	70	26	270	91	404	125	37	4.0	51
MIN	16	13	42	17	9.0	12	32	20	13	2.9	1.0	1.2
AC-FT	2020	2410	4090	1730	748	3590	2890	4310	2290	602	133	1040
CFSM	.14	.17	.29	.12	.06	.25	.21	.30	.16	.04	.01	.08
IN.	.16	.19	.33	.14	.06	.29	.23	.35	.18	.05	.01	.08

CAL YR 1988 TOTAL 20854.9 MEAN 57.0 MAX 484 MIN 2.2 AC-FT 41370 CFSM .24 IN. 3.32
WTR YR 1989 TOTAL 13038.4 MEAN 35.7 MAX 404 MIN 1.0 AC-FT 25860 CFSM .15 IN. 2.08

05482170 BIG CEDAR CREEK NEAR VARINA, IA

LOCATION.--Lat 42°41'16", long 94°47'52", in NE1/4 NE1/4 sec.24, T.91 N., R.34 W., Pocahontas County, Hydrologic Unit 07100006, on left bank 2 ft downstream from bridge on county highway N33, 2.0 mi downstream from Drainage ditch 21, 3.5 mi upstream from Drainage ditch 74, and 5.5 mi northeast of Varina.

DRAINAGE AREA.--80.0 mi^2.

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,225.12 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 28 to Mar. 24 and Apr. 8-10. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--30 years, 41.6 ft^3/s, 7.06 in/yr, 30,140 acre-ft/yr; median of yearly mean discharges, 34 ft^3/s, 5.8 in/yr, 24,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,080 ft^3/s Aug. 31, 1962, gage height, 13.68 ft; maximum gage height, 16.29 ft Mar. 24, 1979, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	2245	ice jam	*6.83	May 24	0845	*168	4.40

Minimum discharge, 0.11 ft^3/s Sept. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39	6.2	19	12	5.4	1.8	11	17	15	5.4	.87	.34
2	28	6.1	23	9.8	5.8	1.3	10	15	14	4.8	.79	.38
3	23	6.5	21	14	3.3	.64	9.9	14	14	4.2	.69	.48
4	18	6.8	18	12	1.9	.50	9.2	15	13	3.8	.70	3.3
5	16	6.3	18	13	2.1	.38	8.4	13	13	3.6	.77	4.9
6	14	6.5	15	17	3.0	.45	8.9	10	12	3.1	1.5	1.1
7	13	5.4	13	15	4.8	1.0	9.7	9.8	14	2.7	.90	1.5
8	12	5.0	19	8.8	5.2	3.1	11	10	12	2.3	.55	5.9
9	11	5.0	22	11	3.4	10	10	9.2	11	1.9	.42	5.0
10	10	5.0	15	9.2	2.4	22	11	8.3	9.9	1.7	.42	1.7
11	9.3	4.6	16	9.6	3.2	23	12	8.1	9.3	2.0	.34	.95
12	8.7	7.0	16	9.0	4.3	18	12	8.3	9.8	2.5	.32	.76
13	8.9	7.9	18	8.0	4.7	13	11	8.3	7.8	2.1	.75	.66
14	13	6.6	19	8.6	5.0	14	12	7.5	7.3	2.4	2.0	.55
15	11	8.0	11	9.0	4.5	16	11	7.2	9.7	6.4	2.6	.49
16	10	8.7	19	8.0	3.8	18	12	7.0	7.9	5.7	1.0	.42
17	9.7	21	20	7.0	2.3	15	11	6.8	6.7	2.9	1.1	.38
18	8.9	21	21	7.6	1.9	19	11	7.6	7.3	3.7	1.0	.32
19	8.2	27	21	8.0	1.5	16	11	7.7	5.5	2.3	.76	.31
20	8.4	30	34	8.0	1.1	16	11	6.3	4.5	1.5	.67	.23
21	8.6	27	39	5.8	1.2	15	11	5.7	4.4	1.2	.50	.18
22	7.8	24	29	6.4	1.2	101	11	6.3	6.6	1.1	.42	.18
23	7.9	23	36	6.4	.80	24	11	27	7.9	1.2	.37	.14
24	7.1	25	28	5.2	.45	22	10	146	5.9	1.1	.33	.14
25	6.8	25	22	4.6	1.0	25	9.6	78	7.3	1.0	.33	.26
26	6.5	23	23	4.0	2.3	22	8.9	44	7.7	.86	.68	.23
27	7.2	21	18	4.7	2.4	24	8.9	31	8.7	.78	1.4	.17
28	6.0	20	19	5.6	2.2	21	18	27	8.8	.70	1.1	.16
29	5.6	22	15	5.2	---	17	22	25	6.4	1.7	1.3	.16
30	5.7	20	16	5.4	---	14	18	20	5.6	3.2	.70	2.4
31	6.4	---	13	7.4	---	12	---	17	---	1.2	.39	---
TOTAL	355.7	430.6	636	265.3	81.15	506.17	341.5	623.1	273.0	79.04	25.67	33.69
MEAN	11.5	14.4	20.5	8.56	2.90	16.3	11.4	20.1	9.10	2.55	.83	1.12
MAX	39	30	39	17	5.8	101	22	146	15	6.4	2.6	5.9
MIN	5.6	4.6	11	4.0	.45	.38	8.4	5.7	4.4	.70	.32	.14
AC-FT	706	854	1260	526	161	1000	677	1240	541	157	51	67
CFSM	.14	.18	.26	.11	.04	.20	.14	.25	.11	.03	.01	.01
IN.	.17	.20	.30	.12	.04	.24	.16	.29	.13	.04	.01	.02

CAL YR 1988 TOTAL 6799.24 MEAN 18.6 MAX 180 MIN .06 AC-FT 13490 CFSM .23 IN. 3.16
WTR YR 1989 TOTAL 3650.92 MEAN 10.0 MAX 146 MIN .14 AC-FT 7240 CFSM .13 IN. 1.70

05482300 NORTH RACCOON RIVER NEAR SAC CITY, IA

LOCATION.--Lat 42°21'16", long 94°59'26", in NW1/4 NW1/4 sec.13, T.87 N., R.36 W., Sac County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on county highway, 2.1 mi upstream from Indian Creek, 0.3 mi upstream from Drainage ditch 73, 4.6 mi south of Sac City, and at mile 367.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--700 mi^2.

PERIOD OF RECORD.--June 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,146.03 ft above NGVD. Prior to Oct. 1, 1987 at site 1.7 miles downstream at datum 1.43 ft lower.

REMARKS.--Estimated daily discharges: Nov. 29 to Dec. 3, Dec. 6, Dec. 9 to Mar. 15, and Apr. 28 to May 1. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather limited automatic remote collector at station.

AVERAGE DISCHARGE.--31 years, 355 ft^3/s, 6.76 in/yr, 257,200 acre-ft/yr; median of yearly mean discharges, 270 ft^3/s, 5.1 in/yr, 196,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft^3/s Mar. 23, 1979, gage height, 18.02 ft; maximum gage height, 18.12 ft Sept. 1, 1962; no flow Jan. 30 to Feb. 4, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 21, 1954, reached a stage of 15.61 ft, from floodmark, discharge, 7,000 ft^3/s .

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 11	0845	*1,700	(a)*12.67				

(a) ice jam

Minimum discharge, 7.5 ft^3/s Sept. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	332	49	78	120	68	48	84	151	145	90	25	8.2
2	245	50	100	110	60	44	93	148	124	76	20	8.4
3	186	49	94	100	56	45	104	141	114	66	17	8.3
4	154	54	110	92	58	44	102	136	103	57	16	26
5	134	57	148	115	56	43	101	151	94	51	15	38
6	125	51	150	260	53	47	100	130	86	43	13	39
7	115	49	105	220	50	90	92	114	81	42	11	34
8	106	49	93	270	49	160	96	103	107	40	11	65
9	101	46	10C	120	48	240	99	102	85	38	10	111
10	94	45	88	100	47	800	94	91	71	36	9.5	84
11	85	43	120	96	46	1200	94	86	65	34	8.6	58
12	78	57	150	94	45	760	90	82	66	35	8.3	48
13	74	66	230	90	44	510	84	84	65	32	8.2	43
14	70	69	220	88	45	400	89	82	61	30	16	41
15	73	67	210	84	44	250	86	75	56	29	15	37
16	71	81	160	80	44	182	81	75	54	29	12	35
17	71	66	130	82	43	208	77	71	51	28	12	34
18	70	122	125	80	44	201	76	74	53	37	9.4	32
19	66	155	145	80	40	207	73	86	53	39	8.9	30
20	63	169	190	82	40	193	71	81	46	33	8.6	30
21	65	126	210	80	42	181	70	70	44	27	8.4	27
22	63	211	195	80	41	170	63	64	61	23	8.6	21
23	58	216	175	79	38	151	58	66	79	22	8.2	18
24	57	171	180	76	44	138	52	423	79	20	8.0	16
25	55	182	185	74	49	131	49	807	78	20	7.9	14
26	53	183	190	60	56	124	72	466	94	19	8.3	14
27	51	171	200	66	50	121	82	308	156	18	11	14
28	51	86	195	64	50	115	142	238	180	16	14	13
29	52	98	190	68	---	108	182	221	137	23	15	12
30	47	86	130	72	---	88	160	191	107	29	12	11
31	47	---	125	78	---	80	---	167	---	34	9.7	---
TOTAL	2912	2924	4721	3160	1350	7079	2716	5084	2595	1116	365.6	969.9
MEAN	93.9	97.5	152	102	48.2	228	90.5	164	86.5	36.0	11.8	32.3
MAX	332	216	230	270	68	1200	182	807	180	90	25	111
MIN	47	43	78	60	38	43	49	64	44	16	7.9	8.2
AC-FT	5780	5800	9360	6270	2680	14040	5390	10080	5150	2210	725	1920
CFSM	.13	.14	.21	.14	.07	.32	.13	.23	.12	.05	.02	.05
IN.	.15	.15	.25	.16	.07	.37	.14	.27	.14	.06	.02	.05

CAL YR 1988 TOTAL 56631 MEAN 155 MAX 821 MIN 11 AC-FT 112300 CFSM .22 IN. 2.95
WTR YR 1989 TOTAL 34992.5 MEAN 95.9 MAX 1200 MIN 7.9 AC-FT 69410 CFSM .13 IN. 1.83

05482315 BLACK HAWK LAKE AT LAKE VIEW, IA

LOCATION.--Lat 42°18'15", long 95°02'30", in NW1/4 SE1/4 sec.33, T.87 N., R.36 W., Sac County, Hydrologic Unit 07100006, on south shore across from swimming beach at Lake View and 2 mi upstream from lake outlet.

DRAINAGE AREA.--23.3 mi^2.

PERIOD OF RECORD.--April 1970 to September 1975, April 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,218.50 ft above NGVD and 2.00 ft below crest of spillway of dam at outlet. Prior to June 25, 1970, nonrecording gage at lake outlet.

REMARKS.--Lake is formed by concrete dam with ungated overflow spillway at elevation 1,220.50 ft above NGVD. Lake is used for conservation and recreation. Area of lake is approximately 957 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 4.08 ft Mar. 20, 1979; minimum, 0.02 ft Sept. 26, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 2.50 ft affected by seiche May 28; minimum, 1.46 ft Sept. 29, 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.21	2.06	2.29	2.27	2.32	2.23	2.27	2.13	2.35	2.27	1.88	1.55
2	2.23	2.07	2.29	2.26	2.33	2.24	2.28	2.13	2.33	2.25	1.87	1.54
3	2.24	2.06	2.29	2.26	2.32	2.27	2.24	2.13	2.31	2.23	1.85	1.57
4	2.24	2.07	2.29	2.25	2.32	2.28	2.21	2.11	2.30	2.22	1.83	1.64
5	2.24	2.04	2.29	2.28	2.31	2.27	2.22	2.08	2.28	2.21	1.82	1.66
6	2.24	2.04	2.29	2.34	2.31	2.27	2.23	2.07	2.25	2.18	1.80	1.66
7	2.24	2.06	2.29	2.36	2.30	2.26	2.24	2.07	2.25	2.17	1.76	1.68
8	2.24	2.06	2.29	2.35	2.29	2.26	2.22	2.06	2.26	2.17	1.75	1.69
9	2.23	2.05	2.28	2.34	2.29	2.27	2.21	2.05	2.25	2.11	1.74	1.69
10	2.21	2.04	2.28	2.33	2.28	2.32	2.21	2.05	2.25	2.09	1.72	1.68
11	2.21	2.07	2.27	2.32	2.27	2.40	2.20	2.04	2.24	2.07	1.70	1.72
12	2.21	2.10	2.27	2.31	2.27	2.43	2.20	2.02	2.23	2.05	1.68	1.72
13	2.21	2.11	2.27	2.30	2.27	2.42	2.19	2.01	2.20	2.02	1.67	1.69
14	2.20	2.13	2.27	2.30	2.26	2.42	2.17	2.00	2.18	2.00	1.72	1.66
15	2.19	2.12	2.26	2.29	2.26	2.41	2.18	1.98	2.17	1.99	1.73	1.62
16	2.19	2.16	2.26	2.28	2.25	2.39	2.17	1.98	2.17	1.97	1.72	1.60
17	2.19	2.20	2.25	2.28	2.25	2.38	2.15	1.98	2.16	1.96	1.71	1.57
18	2.18	2.22	2.25	2.28	2.25	2.37	2.15	1.97	2.16	1.97	1.70	1.53
19	2.18	2.20	2.25	2.27	2.25	2.36	2.14	1.98	2.17	1.95	1.67	1.52
20	2.18	2.22	2.31	2.27	2.26	2.35	2.13	1.97	2.16	1.93	1.66	1.50
21	2.17	2.23	2.31	2.27	2.26	2.33	2.13	1.96	2.13	1.92	1.66	1.52
22	2.18	2.24	2.30	2.26	2.25	2.33	2.18	1.95	2.18	1.91	1.64	1.52
23	2.12	2.25	2.30	2.26	2.25	2.32	2.16	1.95	2.23	1.90	1.63	1.51
24	2.12	2.26	2.29	2.27	2.24	2.31	2.11	2.17	2.24	1.89	1.62	1.51
25	2.11	2.26	2.29	2.27	2.24	2.31	2.10	2.33	2.29	1.88	1.60	1.49
26	2.12	2.27	2.29	2.27	2.24	2.31	2.11	2.39	2.30	1.86	1.61	1.48
27	2.07	2.21	2.30	2.27	2.24	2.31	2.10	2.42	2.30	1.84	1.62	1.52
28	2.07	2.26	2.29	2.28	2.24	2.30	2.16	2.42	2.30	1.83	1.61	1.50
29	2.08	2.28	2.28	2.30	---	2.31	2.13	2.41	2.30	1.89	1.60	1.47
30	2.08	2.29	2.27	2.31	---	2.29	2.13	2.39	2.28	1.91	1.60	1.48
31	2.05	---	2.27	2.31	---	2.28	---	2.37	---	1.90	1.58	---
MEAN	2.18	2.15	2.28	2.29	2.27	2.32	2.18	2.12	2.24	2.02	1.70	1.58
MAX	2.24	2.29	2.31	2.36	2.33	2.43	2.28	2.42	2.35	2.27	1.88	1.72
MIN	2.05	2.04	2.25	2.25	2.24	2.23	2.10	1.95	2.13	1.83	1.58	1.47

CAL YR 1988 MEAN 2.22 MAX 2.81 MIN 1.90
WTR YR 1989 MEAN 2.11 MAX 2.43 MIN 1.47

05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IA

LOCATION.--Lat 41°59'17", long 94°22'36", in SW1/4 NW1/4 sec. 20, T.83 N., R.30 W., Greene County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on State Highway 4, 0.1 mi downstream from Drainage ditch 33 and 40, 1.9 mi south of Jefferson, 4.2 mi upstream from Hardin Creek, and at mile 292.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.--1,619 mi^2.

PERIOD OF RECORD.--March 1940 to current year. Prior to April 1940, monthly discharge only, published in WSP 1308. Prior to October 1955, published as Raccoon River near Jefferson.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940 (M), 1950-51.

GAGE.--Water-stage recorder. Datum of gage is 967.09 ft above NGVD. Prior to Apr. 22, 1946, nonrecording gage at site 4 mi upstream at different datum. Apr. 22 to June 25, 1946, nonrecording gage, June 26, 1946 to Sept. 30, 1955, water-stage recorder, Oct. 1, 1955 to Apr. 30, 1958, nonrecording gage, at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 10 to Mar. 23, Apr. 30 to May 4, June 13,14, July 30 to Aug 2, Aug. 11-15, 25, 26, and Aug. 29-31. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector and U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--49 years, 734 ft^3/s, 6.16 in/yr, 531,80C acre-ft/yr; median of yearly mean discharges, 600 ft^3/s, 5.0 in/yr, 435,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,100 ft^3/s June 23, 1947, gage height, 22.3 ft; minimum daily discharge, 0.6 ft^3/s Oct. 5, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 24	1130	*1,740	*8.97				

Minimum discharge, 10 ft^3/s Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	524	132	270	330	170	118	291	349	392	453	87	16
2	556	129	281	310	140	110	280	322	371	379	84	12
3	470	128	295	290	120	115	270	306	441	323	77	11
4	388	128	285	265	125	112	259	288	534	278	62	58
5	332	132	264	270	130	110	253	279	549	239	69	60
6	297	134	242	280	135	105	247	259	423	208	100	73
7	272	137	259	300	120	100	240	250	355	187	94	94
8	255	127	253	240	115	120	237	229	501	166	62	151
9	242	114	177	260	120	350	239	209	900	149	52	234
10	229	109	190	250	125	580	242	193	686	130	44	212
11	214	107	210	240	120	1400	248	177	486	132	33	210
12	202	119	300	230	110	1200	244	166	369	112	29	203
13	191	127	275	210	105	1000	239	152	328	99	25	172
14	181	130	230	200	100	800	242	151	310	89	25	140
15	175	166	200	250	100	540	232	156	290	86	36	121
16	168	169	210	240	98	470	221	183	279	81	68	108
17	162	200	270	230	100	400	216	187	255	77	55	100
18	163	226	320	220	98	360	208	209	247	99	54	89
19	159	231	340	210	96	370	207	242	233	92	66	81
20	157	261	360	200	105	330	196	327	209	89	61	77
21	156	293	350	200	98	350	183	306	192	88	45	71
22	154	298	365	190	100	300	136	276	202	88	34	69
23	155	282	380	180	96	290	132	405	213	80	52	65
24	151	320	360	170	110	303	140	1460	245	69	44	64
25	149	324	350	165	130	326	168	1610	337	63	25	61
26	146	307	355	160	125	348	165	1530	454	61	29	54
27	144	315	370	165	120	379	167	1130	661	58	41	47
28	139	307	340	145	120	368	217	789	885	54	38	43
29	137	270	340	145	---	351	249	631	709	85	30	41
30	137	263	350	150	---	333	324	528	564	95	25	38
31	136	---	340	160	---	309	---	455	---	91	22	---
TOTAL	6941	5985	9131	6855	3231	12347	6692	13754	12620	4300	1568	2775
MEAN	224	199	295	221	115	398	223	444	421	139	50.6	92.5
MAX	556	324	380	330	170	1400	324	1610	900	453	100	234
MIN	136	107	177	145	96	100	132	151	192	54	22	11
AC-FT	13770	11870	18110	13600	6410	24490	13270	27280	25030	8530	3110	5500
CFSM	.14	.12	.18	.14	.07	.25	.14	.27	.26	.09	.03	.06
IN.	.16	.14	.21	.16	.07	.28	.15	.32	.29	.10	.04	.06

CAL YR 1988 TOTAL 120608 MEAN 330 MAX 1400 MIN 37 AC-FT 239200 CFSM .20 IN. 2.77
WTR YR 1989 TOTAL 86199 MEAN 236 MAX 1610 MIN 11 AC-FT 171000 CFSM .15 IN. 1.98

05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IA

LOCATION.--Lat 42°06'27", long 94°22'12", in SE1/4 SW1/4 sec. 5, T.84 N., R.30 W., Greene County, Hydrologic Unit 07100006, on left bank 35 ft upstream from bridge on county highway E26, 1.6 mi upstream from small left-bank tributary, 4.4 mi upstream from mouth, and 6.5 mi southeast of Churdan.

DRAINAGE AREA.--24.0 mi^2.

PERIOD OF RECORD.--July 1952 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1708: 1954-55, 1957 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,050.90 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 31 to Jan. 1, Jan. 4-13, Jan. 20 to Feb. 9, Feb. 16 to Mar. 1, Mar. 13-15, and June 30 to July 6. Records good except those for estimated daily discharges, which are poor. Small diversion for irrigation upstream from station.

AVERAGE DISCHARGE.--36 years, 10.6 ft^3/s, 6.00 in/yr, 7,680 acre-ft/yr; median of yearly mean discharges, 8.3 ft^3/s, 4.7 in/yr, 6,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 870 ft^3/s June 30, 1986 gage height, 10.78 ft, from flood mark; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 150 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Dec. 9	0415	*37	2.64	Jan. 27	0915	ice jam	*3.29

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.22	.00	.00	.19	.50	.70	.23	.10	.70	7.9	.00	.00
2	.33	.00	.00	.25	.35	.64	.24	.14	.70	6.5	.00	.00
3	.16	.00	.00	.29	.22	.70	.24	.16	8.9	5.3	.00	.00
4	.03	.00	.00	.30	.25	.66	.19	.19	10	4.5	.00	.00
5	.00	.00	.00	.26	.31	.76	.10	.21	5.5	3.9	.00	.00
6	.00	.00	.00	.23	.46	.72	.03	.07	4.1	3.4	.00	.00
7	.01	.00	.08	.19	.50	1.0	.06	.0	4.1	3.0	.00	.00
8	.00	.00	.00	.16	.54	1.0	.12	.01	6.7	2.7	.00	.00
9	.00	.00	.00	.12	.58	1.1	.06	.03	5.4	2.4	.00	.00
10	.01	.00	.01	.14	.60	15	.01	.02	4.0	2.1	.00	.00
11	.00	.00	.18	.16	.68	10	.01	.00	3.5	4.2	.00	.00
12	.00	.00	.20	.20	.62	5.0	.04	.00	3.5	2.8	.00	.00
13	.00	.00	.30	.38	.66	3.8	.03	.00	2.9	2.7	.00	.00
14	.00	.00	.50	.32	.62	3.0	.00	.02	2.4	2.2	.00	.00
15	.00	.07	.26	.20	.60	4.1	.03	.00	2.1	1.8	.00	.00
16	.00	.03	.24	.18	.62	1.6	.02	.00	2.0	1.6	.00	.00
17	.00	.09	.26	.20	.58	2.8	.01	.00	2.0	1.3	.00	.00
18	.00	.02	.35	.25	.60	1.2	.00	.04	2.1	1.9	.00	.00
19	.00	.00	.41	.35	.52	.76	.00	.21	2.2	1.4	.00	.00
20	.00	.04	.30	.20	.48	.43	.00	.08	1.9	1.6	.00	.00
21	.00	.00	.28	.24	.52	.50	.00	.00	1.8	1.4	.00	.00
22	.00	.00	.40	.30	.45	.79	.00	.00	1.9	.76	.00	.00
23	.00	.00	.29	.26	1.0	.76	.00	.24	3.2	.35	.00	.00
24	.00	.00	.20	.24	1.0	.83	.0	41	3.3	.22	.00	.00
25	.00	.00	.18	.22	1.0	.90	.00	16	4.9	.15	.00	.00
26	.00	.00	.21	.20	1.0	.79	.00	5.6	21	.03	.00	.00
27	.00	.04	.17	.50	1.0	.76	.0	2.8	65	.00	.00	.00
28	.00	.01	.11	.33	1.0	.71	.22	2.1	34	.00	.00	.00
29	.00	.00	.24	.42	---	.48	.08	1.8	17	.00	.00	.00
30	.00	.00	.26	.70	---	.31	.09	1.4	11	.00	.00	.00
31	.00	---	.21	1.2	---	.26	---	.95	---	.00	.00	---
TOTAL	0.76	0.30	5.64	9.18	17.26	62.06	1.81	73.17	237.80	66.11	0.00	0.00
MEAN	.025	.010	.18	.30	.62	2.00	.060	2.36	7.93	2.13	.00	.00
MAX	.33	.09	.50	1.2	1.0	15	.24	41	65	7.9	.00	.00
MIN	.00	.00	.00	.12	.22	.26	.00	.00	.70	.00	.00	.00
AC-FT	1.5	.6	11	18	34	123	3.6	145	472	131	.0	.0
CFSM	.00	.00	.01	.01	.03	.08	.00	.10	.33	.09	.00	.00
IN.	.00	.00	.01	.01	.03	.10	.00	.11	.37	.10	.00	.00

CAL YR 1988 TOTAL 760.74 MEAN 2.08 MAX 9.0 MIN .00 AC-FT 1510 CFSM .09 IN. 1.18
WTR YR 1989 TOTAL 474.09 MEAN 1.30 MAX 65 MIN .00 AC-FT 940 CFSM .05 IN. .73

05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IA

LOCATION.--Lat 41°46'43", long 94°29'33", in SW1/4 SW1/4 sec. 32, T.81 N., R.31 W., Guthrie County, Hydrologic Unit 07100007, on left bank 15 ft, downstream from bridge on State Highway 25, 0.2 mi downstream from Battle Run Creek, 1.8 mi upstream from Springbrook Creek, 5.8 mi southeast of Bayard, 10.4 mi upstream from dam at Lake Panorama, and at mile 279.2 upstream from mouth of Des Moines River.

DRAINAGE AREA.--375 mi^2.

PERIOD OF RECORD.--March 1979 to current year. Occasional low-flow measurements, water years 1976,77. Contracted-opening measurement of July 3, 1973 flood.

GAGE.--Water-stage recorder. Datum of gage is 1,040.00 ft above NGVD. Prior to June 23, 1979, nonrecording gage on downstream side of State Highway 25 bridge.

REMARKS.--Estimated daily discharges: Nov. 20 to Mar. 11, and Mar. 18-25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. Gage-height telemeter at station.

AVERAGE DISCHARGE.--10 years, 221 ft^3/s,8.00 in/yr 160,100 acre-ft/yr. Median of yearly mean discharges,486 ft^3/s, 6.7 in/yr, 134,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,300 ft^3/s June 30, 1986, gage height, 24.70 ft; minimum daily discharge, 5.5 ft^3/s, June 13, 14, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 3, 1973 reached a stage of 21.63 ft, from contracted-opening measurement, discharge, 14,600 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	1045	1,450	(a) *18.35	May 29	1745	1,440	14.68
May 24	2030	2,620	17.35	Sept. 8	1615	*3,090	18.11

(a) Ice jam.

Minimum discharge, 25 ft^3/s May 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	172	37	54	62	100	54	56	69	143	178	40	41
2	117	37	53	62	60	45	57	64	116	157	37	36
3	95	37	50	62	33	47	55	60	265	145	36	33
4	81	38	49	64	34	45	56	56	270	126	35	158
5	72	41	49	74	35	44	53	55	140	117	48	216
6	65	39	51	100	36	38	51	52	118	106	60	94
7	63	35	49	150	37	80	50	45	115	97	37	155
8	60	36	71	110	36	130	52	42	649	90	32	1910
9	59	36	68	86	35	400	51	39	267	84	29	1140
10	58	36	66	66	36	940	45	36	163	75	28	570
11	53	36	68	54	37	450	43	34	134	165	26	358
12	50	45	70	50	38	192	43	30	473	113	26	251
13	48	55	73	44	35	126	42	30	276	89	32	202
14	48	45	70	42	36	105	39	30	179	73	46	168
15	46	80	67	38	40	91	38	27	150	76	70	142
16	45	79	66	37	40	83	37	26	132	67	52	122
17	44	72	68	37	39	71	39	26	120	76	35	108
18	42	71	72	35	37	64	39	28	116	120	31	98
19	42	68	76	34	37	60	38	53	104	79	39	90
20	42	60	80	33	37	60	35	69	90	60	38	84
21	43	61	82	32	38	52	32	46	84	59	33	79
22	43	60	74	34	38	54	32	44	113	56	28	74
23	42	60	66	37	36	54	32	32	266	57	33	66
24	41	58	58	34	36	52	30	1340	152	60	29	65
25	40	58	54	32	37	52	30	1040	427	52	28	65
26	40	58	56	30	40	56	37	389	700	45	94	62
27	41	59	60	35	48	55	73	227	635	43	567	60
28	39	58	62	40	64	55	319	169	334	44	109	59
29	39	58	62	70	---	54	134	713	248	75	70	58
30	39	57	62	120	---	54	81	488	208	78	55	55
31	40	---	61	150	---	58	---	195	---	46	46	---
TOTAL	1749	1570	1967	1854	1155	3721	1719	5554	7187	2708	1869	6619
MEAN	56.4	52.3	63.5	59.8	41.2	120	57.3	179	240	87.4	60.3	221
MAX	172	80	82	150	100	940	319	1340	700	178	567	1910
MIN	39	35	49	30	33	38	30	26	84	43	26	33
AC-FT	3470	3110	3900	3680	2290	7380	3410	11020	14260	5370	3710	13130
CFSM	.15	.14	.17	.16	.11	.32	.15	.48	.64	.23	.16	.59
IN.	.17	.16	.20	.18	.11	.37	.17	.55	.71	.27	.19	.66

CAL YR 1988 TOTAL 35770 MEAN 97.7 MAX 1430 MIN 24 AC-FT 70950 CFSM .26 IN. 3.55
WTR YR 1989 TOTAL 37672 MEAN 103 MAX 1910 MIN 26 AC-FT 74720 CFSM .28 IN. 3.74

05483470 LAKE PANORAMA AT PANORA, IOWA

LOCATION.--Lat 41°41'44", long 94°22'53", in SW1/4 NE1/4 sec.31, T.80 N., R.30 W., Guthrie County, Hydrologic Unit 07100007, in gate control building of dam on Middle Raccoon River, 0.5 mi upstream from State Highway 44, 1.0 mi west of Panora, 4.4 mi upstream from Bay Branch, and at mile 268.8 upstream from mouth of Des Moines River.

DRAINAGE AREA.--433 mi^2.

PERIOD OF RECORD.--May 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,000.00 ft above NGVD.

REMARKS.--Lake is formed by earthfill dam with 100 ft bascule gate and concrete chute spillway, and 300 ft earthen emergency spillway. Low-flow outlet is 30-inch conduit and gate valve through dam. Dam was completed in August, 1970 and began filling April 27, 1971. Total storage, 60,000 acre-ft, surface area, 2,900 acres, at top of dam, elevation 1,068 ft. Storage unknown at top of spillway, elevation 1,048 ft. Normal storage, 19,700 acre-ft, surface area, 1,270 acres with bascule gate closed, elevation 1,045 ft. Dead storage unknown with bascule gate open, elevation 1,036 ft. Present lake classification is utility (industrial) but is also used for recreation. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 50.10 ft June 30, 1986; minimum, 43.96 ft July 22, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 46.88 ft Jan. 26; minimum recorded, 44.73 ft July 12.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	45.98	45.16	45.20	45.17	45.78	45.32	45.45	45.65	45.37	45.59	45.26	---
2	45.84	45.15	45.20	45.16	45.62	45.32	45.46	45.57	45.47	---	45.22	---
3	45.70	45.16	45.23	45.15	45.50	45.32	45.46	45.50	45.50	---	45.21	---
4	45.61	45.19	45.22	45.15	45.48	45.29	45.43	45.46	45.64	---	45.21	---
5	45.53	45.23	45.21	45.20	45.46	45.26	45.42	45.45	45.58	---	45.22	---
6	45.48	45.17	45.22	45.31	45.44	45.22	45.40	45.42	45.46	---	45.22	---
7	45.45	45.15	45.22	45.49	45.40	45.21	45.43	45.38	45.37	---	45.22	---
8	45.43	45.14	45.27	---	45.36	45.26	45.39	45.38	45.53	---	45.21	---
9	45.42	45.15	45.16	45.57	45.33	45.61	45.36	45.37	45.27	---	45.19	---
10	45.43	45.15	45.14	45.52	45.31	45.26	45.34	45.36	45.39	---	45.18	---
11	45.40	45.13	45.12	45.51	45.30	45.39	45.32	45.34	45.32	44.97	45.16	---
12	45.34	45.20	45.11	45.48	45.29	45.48	45.30	45.33	45.23	44.82	45.15	---
13	45.31	45.21	45.12	45.46	45.30	45.50	45.30	45.31	45.20	44.82	45.13	---
14	45.31	45.21	45.12	45.46	45.29	45.46	45.29	45.30	45.20	44.86	45.12	---
15	45.31	45.41	---	45.47	45.29	45.39	45.30	45.30	45.22	44.90	45.10	---
16	45.32	45.58	45.14	45.46	45.25	45.34	45.32	45.28	45.14	44.96	45.16	---
17	45.32	45.53	45.11	45.40	45.24	45.30	45.33	45.26	44.90	44.99	45.16	---
18	45.29	45.46	45.10	45.40	45.24	45.23	45.31	45.28	44.83	45.28	45.15	---
19	45.28	45.43	45.11	45.39	45.24	45.19	45.31	45.36	44.96	45.28	45.21	---
20	45.27	45.40	45.15	45.42	45.25	45.21	45.32	45.41	45.05	45.23	45.24	---
21	45.28	45.33	45.17	45.42	45.24	45.20	45.30	45.40	45.19	45.15	45.23	---
22	45.26	45.30	45.18	45.39	45.23	45.25	45.31	45.38	45.32	45.12	45.23	---
23	45.30	45.30	45.20	45.40	45.21	45.31	45.32	45.36	45.37	45.10	45.24	---
24	45.24	45.28	45.23	45.40	45.19	45.36	45.34	45.74	45.35	45.10	45.26	---
25	45.23	45.29	45.29	45.41	45.19	45.38	45.35	46.24	45.18	45.09	45.28	---
26	45.19	45.29	45.17	45.72	45.21	45.41	45.31	45.39	45.07	45.05	45.34	---
27	45.20	45.30	45.20	45.43	45.25	45.45	45.43	45.30	44.94	45.04	45.58	---
28	45.17	45.43	45.36	45.38	45.31	45.46	45.53	45.24	45.07	45.04	45.41	45.41
29	45.17	45.19	45.24	45.47	---	45.48	45.79	45.39	45.33	45.11	45.52	45.39
30	45.16	45.20	45.20	45.56	---	45.47	45.75	45.71	45.58	45.17	45.45	45.35
31	45.16	---	45.18	45.79	---	45.45	---	45.43	---	45.24	---	---
MEAN	45.37	45.27	---	---	45.33	45.35	45.39	45.43	45.27	---	---	---
MAX	45.98	45.58	---	---	45.78	45.61	45.79	46.24	45.64	---	---	---
MIN	45.16	45.13	---	---	45.19	45.19	45.29	45.24	44.83	---	---	---

05483600 MIDDLE RACCOON RIVER AT PANORA, IA

LOCATION.--Lat 41°41'14", long 94°22'15", in NE1/4 NW1/4 sec.5, T.79 N., R.30 W., Guthrie County, Hydrologic Unit 07100007, on left bank 15 ft downstream from bridge on county highway, 0.2 mi southwest of Panora, 1.5 mi upstream from Andy's Branch, 1.6 mi downstream from Lake Panorama, 18.2 mi upstream from mouth, and at mile 267.2 upstream from mouth of Des Moines River.

DRAINAGE AREA.--440 mi^2.

PERIOD OF RECORD.--June 1958 to current year.

REVISED RECORDS.--WDR IOWA 1974: 1973 (P).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 991.20 ft above NGVD.

REMARKS.--No estimated daily discharges. Records good. City of Panora diverts approximately 100 acre-ft/yr upstream of station. Flow regulated by dam on Lake Panorama since August 1970. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--31 years, 220 ft^3/s, 6.79 in/yr 159,400 acre-ft/yr; median of yearly mean discharges, 170 ft^3/s, 5.2 in/yr, 123,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,300 ft^3/s June 30, 1986, gage height, 15.50 ft; no flow June 9, 10, 1977, result of gate operation at Lake Panorama; minimum daily discharge, excluding regulation at Lake Panorama, 3.0 ft^3/s July 9, 14, 22-23, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 10, 1953, reached a stage of 14.3 ft, from floodmark, discharge, about 14,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 8	1400	*3,300	*8.40	No other peak greater than base discharge.			

Minimum daily discharge, 30 ft^3/s July 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	199	43	61	50	162	64	59	119	99	132	53	36
2	171	44	61	50	121	64	60	99	73	212	51	35
3	135	45	67	50	90	62	60	86	235	124	49	34
4	112	48	65	41	76	62	62	76	246	109	50	124
5	94	58	63	31	67	57	57	62	213	87	49	190
6	78	55	63	36	75	52	56	58	172	104	46	65
7	74	47	65	56	71	51	54	52	113	88	47	144
8	70	46	58	77	62	61	67	51	610	88	45	1730
9	68	46	54	72	57	133	61	52	361	100	43	1400
10	66	50	51	68	54	1250	55	48	65	112	41	443
11	61	48	50	66	51	761	52	45	126	221	39	346
12	56	54	49	62	49	193	51	44	398	236	37	408
13	53	57	49	58	50	141	49	44	403	37	37	262
14	52	58	52	56	49	133	49	42	141	40	35	36
15	52	86	53	53	49	115	43	41	137	41	37	44
16	52	159	52	52	48	102	39	42	104	42	42	64
17	53	131	50	52	46	93	41	38	219	34	42	80
18	49	115	49	50	46	77	41	39	225	103	40	89
19	48	109	49	50	46	69	42	45	32	122	46	93
20	49	101	52	50	47	70	41	54	31	95	50	93
21	52	89	53	50	47	52	41	49	37	90	47	91
22	48	84	58	50	47	36	40	43	64	64	45	94
23	53	82	60	50	45	39	39	41	154	58	47	80
24	46	81	65	52	44	45	40	538	230	50	39	71
25	47	82	60	53	43	48	42	1630	415	85	31	70
26	45	81	57	54	44	49	45	640	750	42	53	66
27	48	85	58	52	49	54	67	239	774	31	570	65
28	44	72	55	56	58	59	128	235	273	30	136	77
29	43	64	54	77	---	60	171	240	95	36	55	93
30	43	62	53	89	---	66	140	742	95	43	73	85
31	44	---	51	151	---	61	---	293	---	52	35	---
TOTAL	2105	2182	1738	1814	1693	4179	1792	5827	6890	2708	2010	6508
MEAN	67.9	72.7	56.1	58.5	60.5	135	59.7	188	230	87.4	64.8	217
MAX	199	159	67	151	162	1250	171	1630	774	236	570	1730
MIN	43	43	49	31	43	36	39	38	31	30	31	34
AC-FT	4180	4330	3450	3600	3360	8290	3550	11560	13670	5370	3990	12910
CFSM	.15	.17	.13	.13	.14	.31	.14	.43	.52	.20	.15	.49
IN.	.18	.18	.15	.15	.14	.35	.15	.49	.58	.23	.17	.55

CAL YR 1988 TOTAL 37363 MEAN 102 MAX 1150 MIN 27 AC-FT 74110 CFSM .23 IN. 3.16
WTR YR 1989 TOTAL 39446 MEAN 108 MAX 1730 MIN 30 AC-FT 78240 CFSM .25 IN. 3.33

05484000 SOUTH RACCOON RIVER AT REDFIELD, IA

LOCATION.--Lat 41°35'22", long 94°09'33", in NE1/4 NE1/4 sec. 2, T.78 N., R.28 W., Dallas County, Hydrologic Unit 07100007, on right bank 20 ft upstream from bridge on county highway at Redfield, 3.2 mi downstream from bridge on U.S. Highway 6, 3.4 mi downstream from Middle Raccoon River, 14.0 mi upstream from mouth, and at mile 245.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.--994 mi^2.

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940.

GAGE.--Water-stage recorder. Datum of gage is 876.43 ft above NGVD. Prior to June 12, 1946, nonrecording gage, June 12, 1946 to Sept. 30, 1966, water-stage recorder at site 20 ft upstream at same datum. Sept. 30, 1966, to Sept. 30, 1986 water-stage recorder at site 1.5 mi upstream at datum 20.0 ft higher.

REMARKS.--Estimated daily discharges: Nov. 19 to Mar. 12, Mar. 18, 19, and 21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and data collection platform at station.

AVERAGE DISCHARGE.--49 years, 463 ft^3/s, 6.32 in/yr, 335,400 acre-ft/yr; median of yearly mean discharges, 400 ft^3/s, 5.5 in/yr, 290,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft^3/s July 2, 1958, gage height, 29.04 ft, from floodmark; minimum daily discharge, 17 ft^3/s Aug. 4, 1977 at site 1.5 mi upstream from present site.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 8	2115	*9,380	*13.33	No other peak greater than base discharge.			

Minimum discharge, 70.0 ft^3/s June 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	302	92	115	115	200	105	125	214	252	185	108	100
2	268	89	115	115	140	100	122	186	144	290	101	82
3	229	89	110	112	80	105	119	163	261	210	95	81
4	203	95	110	110	150	105	118	147	309	201	99	129
5	177	107	108	105	130	100	118	125	287	145	93	379
6	157	111	102	110	115	100	111	110	238	174	90	211
7	148	102	100	140	100	98	109	104	201	139	88	230
8	142	91	95	135	90	130	117	99	338	154	89	3450
9	131	89	90	130	84	350	119	99	649	177	81	3880
10	131	89	110	130	82	700	107	96	173	133	73	1430
11	120	89	200	130	82	560	99	89	132	183	76	655
12	107	101	190	120	84	440	95	87	252	419	77	654
13	99	123	180	120	84	329	94	86	665	149	75	604
14	94	125	160	115	86	279	90	86	222	105	75	286
15	95	138	150	115	88	245	89	84	205	121	81	215
16	100	473	150	110	90	214	82	80	130	113	92	206
17	97	272	155	105	91	194	83	77	201	100	83	214
18	96	214	160	105	94	145	80	91	295	171	75	223
19	94	170	165	100	96	160	80	112	143	293	89	218
20	91	150	160	100	96	156	85	122	74	202	118	203
21	98	140	160	98	98	150	94	114	70	151	99	195
22	100	138	155	98	98	117	98	97	99	125	96	189
23	95	135	150	105	94	111	101	94	171	125	103	187
24	94	135	135	98	92	113	105	132	325	105	117	167
25	94	130	120	96	96	115	109	1740	528	138	100	158
26	91	130	110	92	98	117	113	954	1020	106	114	156
27	89	130	115	90	105	126	230	319	1140	90	613	151
28	92	115	105	160	110	134	325	356	575	79	510	152
29	89	108	120	350	---	134	356	523	282	90	191	177
30	87	112	115	420	---	130	243	1020	150	133	170	180
31	88	---	115	300	---	130	---	454	---	125	168	---
TOTAL	3898	4082	4125	4229	2853	5992	3816	8060	9531	4931	4039	15162
MEAN	126	136	133	136	102	193	127	260	318	159	130	505
MAX	302	473	200	420	200	700	356	1740	1140	419	613	3880
MIN	87	89	90	90	80	98	80	77	70	79	73	81
AC-FT	7730	8100	8180	8390	5660	11890	7570	15990	18900	9780	8010	30070
CFSM	.13	.14	.13	.14	.10	.20	.13	.26	.32	.16	.13	.51
IN.	.15	.15	.16	.16	.11	.23	.14	.30	.36	.19	.15	.57

CAL YR 1988 TOTAL 81409 MEAN 222 MAX 2000 MIN 68 AC-FT 161500 CFSM .23 IN. 3.07
WTR YR 1989 TOTAL 70718 MEAN 194 MAX 3880 MIN 70 AC-FT 140300 CFSM .20 IN. 2.66

05484500 RACCOON RIVER AT VAN METER, IA

LOCATION.--Lat 41°32'02", long 93°56'59", in SW1/4 SW1/4 sec.22, T.78 N., R.27 W., Dallas County, Hydrologic Unit 07100007, on right bank 10 ft downstream from bridge on county highway R16, 0.3 mi northeast of Van Meter, 0.7 mi upstream from small left bank tributary, 1.1 mi downstream from confluence of North and South Raccoon Rivers, 29.0 mi upstream from mouth, and at mile 230.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.--3,441 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1915 to current year. Prior to October 1934, monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1927 (M), WSP 1438: Drainage area, WSP 1508: 1915 (M), 1925 (M), 1926, 1933 (M), 1939 (M), 1947 (M), 1949 (M).

GAGE.--Water-stage recorder. Datum of gage is 841.16 ft above NGVD. See WSP 1308 for history of changes prior to Aug. 8, 1934.

REMARKS.--Estimated daily discharges: Dec. 9 to Mar. 15, and Sept. 9-11. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and data collection platform and U.S. Weather Service Limited Automatic Remote Collector telemeter at station.

AVERAGE DISCHARGE.--74 years, 1,410 ft^3/s, 5.56 in/yr, 1,022,000 acre-ft/yr; median of yearly mean discharges, 1,120 ft^3/s, 4.4 in/yr, 811,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,200 ft^3/s June 13, 1947, gage height, 21.37 ft, from floodmark; maximum gage height, 22.69 ft July 1, 1986; minimum daily discharge, 10 ft^3/s Jan. 22-31, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	----	Ice Jam	*11.00	Sept. 9	unknown	*7,640	(a) 9.98

(a) From floodmark
Minimum discharge, 105 ft^3/s Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	504	242	447	320	480	245	498	532	1170	1100	301	146
2	672	245	434	320	360	280	469	512	876	964	257	122
3	758	242	502	315	450	320	452	488	842	932	246	116
4	752	256	480	310	520	290	433	491	982	731	235	168
5	644	255	492	300	560	270	416	471	1250	631	189	371
6	549	257	480	290	520	300	400	430	1340	539	169	455
7	486	252	443	320	470	280	396	413	1090	506	136	336
8	445	246	404	350	440	260	400	409	949	452	140	1660
9	420	247	270	480	400	800	401	398	1500	422	133	4980
10	398	250	220	600	370	1650	390	374	1510	404	124	2560
11	375	244	245	520	320	1950	376	353	1390	397	112	1680
12	349	259	320	460	295	1800	385	339	1130	666	124	1090
13	337	288	360	420	280	2100	382	331	1480	505	136	976
14	326	286	320	380	245	1800	380	322	1010	348	116	686
15	319	305	255	355	250	1500	370	314	801	340	120	461
16	305	678	275	350	240	1180	355	311	714	321	128	404
17	293	700	280	345	240	768	342	306	625	291	131	382
18	280	550	290	340	235	592	337	326	739	454	121	374
19	277	508	285	340	235	597	324	349	685	695	124	359
20	281	494	290	335	240	632	309	345	460	512	177	339
21	293	466	290	335	230	576	299	363	407	391	167	317
22	287	479	300	330	240	587	265	381	376	354	133	295
23	279	528	300	320	240	522	276	377	438	346	159	277
24	274	527	325	305	235	502	280	445	633	346	170	251
25	263	521	315	295	250	495	281	1960	977	312	148	241
26	261	578	310	280	260	498	278	3530	1610	310	154	232
27	255	556	310	280	270	520	345	2560	1960	256	414	221
28	252	481	305	270	260	562	588	2070	1990	218	942	215
29	247	496	335	360	---	578	691	1830	1800	218	376	225
30	238	496	345	450	---	572	555	2180	1410	264	207	242
31	240	---	320	600	---	542	---	1610	---	314	206	---
TOTAL	11659	11932	10547	11275	9135	23568	11673	25120	32144	14539	6295	20181
MEAN	376	398	340	364	326	760	389	810	1071	469	203	673
MAX	758	700	502	600	560	2100	691	3530	1990	1100	942	4980
MIN	238	242	220	270	230	245	265	306	376	218	112	116
AC-FT	23130	23670	20920	22360	18120	46750	23150	49830	63760	28840	12490	40030
CFSM	.11	.12	.10	.11	.09	.22	.11	.24	.31	.14	.06	.20
IN.	.13	.13	.11	.12	.10	.25	.13	.27	.35	.16	.07	.22

CAL YR 1988 TOTAL 244215 MEAN 667 MAX 3040 MIN 114 AC-FT 484400 CFSM .19 IN. 2.64
WTR YR 1989 TOTAL 188068 MEAN 515 MAX 4980 MIN 112 AC-FT 373000 CFSM .15 IN. 2.03

05484500 RACCOON RIVER AT VAN METER, IA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD: Chemical analyses: Partial record station September 1968 to September 1973, February 1974 to September 1979 and October 1986 to current year.

Water temperatures: Partial record station September 1968 to September 1973 and February 1974 to September 1979.

Biological analyses: February 1974 to September 1979.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TEMPER-ATURE AIR (DEG C) (00020)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT 20...	1245	279	550	8.70	10.0	7.0	6.4	11.5	105	738	550	140
DEC 14...	1315	323	775	8.30	0.0	3.0	3.3	13.9	98	740	K16000	420
MAR 21...	1600	516	512	8.10	4.0	3.0	3.9	12.8	99	749	170	110
MAY 03...	1315	486	485	9.00	16.5	15.0	--	11.8	124	746	530	480
JUL 06...	1200	519	435	9.10	29.0	29.0	170	9.2	123	744	140	140
AUG 25...	1300	149	456	8.60	24.0	22.5	19	10.4	128	740	340	80

DATE	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
OCT 20...	76	320	74	32	21	12	0.5	4.8	240	18	256	61
DEC 14...	80	370	92	35	22	11	0.5	3.6	296	0	361	63
MAR 21...	57	250	67	21	12	9	0.3	5.5	196	0	239	43
MAY 03...	250	250	67	21	12	9	0.3	5.5	158	15	163	43
JUL 06...	56	200	38	26	13	12	0.4	3.1	124	13	124	44
AUG 25...	40	220	52	22	16	13	0.5	5.0	--	--	--	41

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 20...	27	0.40	13	408	397	0.55	307	0.66	4.20	<0.010	0.070	0.040
DEC 14...	34	0.40	14	462	469	0.63	400	0.69	6.30	0.040	0.120	0.110
MAR 21...	18	0.30	15	320	316	0.44	446	0.62	3.20	0.040	0.630	0.580
MAY 03...	18	0.30	15	320	198	0.44	420	0.62	3.20	0.041	0.630	0.580
JUL 06...	32	0.40	14	265	272	0.36	371	2.6	4.60	0.080	0.040	0.040
AUG 25...	21	0.30	8.2	280	278	0.38	113	0.49	0.810	0.010	0.040	0.010

K Results based on colony count outside ideal range.

05484500 RACCOON RIVER AT VAN METER, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO 1989

DATE	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P) (00671)	PHOSPHOROUS DISSOLVED (MG/L AS P) (00666)	PHOSPHOROUS TOTAL (MG/L AS P) (00665)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)
OCT												
20...	0.70	0.080	0.110	0.140	14	11	100	3	<10	110	<0.5	<1
DEC												
14...	0.80	0.150	0.170	0.190	43	37	44	--	--	--	--	--
MAR												
21...	1.2	0.230	0.270	0.190	76	106	96	2	20	110	<0.5	<1
MAY												
03...	1.2	0.230	0.270	--	197	259	98	2	20	110	<0.5	<1
JUL												
06...	2.6	<0.010	0.020	0.070	641	898	100	--	--	--	--	--
AUG												
25...	0.50	0.050	0.070	0.100	53	21	99	3	20	110	<0.5	<1

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)
OCT											
20...	<1	<3	15	10	<5	22	12	<0.1	<10	3	2
DEC											
14...	--	--	--	--	--	--	--	--	--	--	--
MAR											
21...	<1	<3	3	14	<5	13	19	<0.1	<10	2	2
MAY											
03...	<1	<3	3	14	--	--	--	--	--	--	--
JUL											
06...	--	--	--	--	--	--	--	--	--	--	--
AUG											
25...	2	<3	8	7	<1	14	12	0.2	<10	4	1

[Pesticide concentration expressed as total recoverable]

DATE	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	ATRAZINE, TOTAL (UG/L) (39630)	CYANAZINE TOTAL (UG/L) (81757)	METRIBUZIN IN WHOLE WATER (UG/L) (81408)	ALACHLOR TOTAL RECOVER (UG/L) (77825)	METOLACHLOR IN WHOLE WATER (UG/L) (39356)	TRIFLURALIN TOTAL RECOVER (UG/L) (39030)	BUTYLATE (UG/L) (99901)
OCT											
20...	<1.0	260	<6	12	--	--	--	--	--	--	--
DEC											
14...	--	--	--	--	--	--	--	--	--	--	--
MAR											
21...	<1.0	190	<6	15	<0.10	<0.10	0.14	0.10	<0.10	<0.10	<0.10
MAY											
03...	--	--	--	--	0.39	0.58	0.34	0.17	<0.10	<0.10	<1.0
JUL											
06...	--	--	--	--	0.88	0.33	0.46	<0.10	<0.10	<0.10	<0.10
AUG											
25...	<1.0	200	<6	7	--	--	--	--	--	--	--

05484800 WALNUT CREEK AT DES MOINES, IA

LOCATION.--Lat 41°35'14", long 93°42'11", in SW1/4 SE1/4 sec.2, T.78 N., R.25 W., Polk County, Hydrologic Unit 07100006, on left bank, 25 ft downstream from bridge on 63rd Street in Des Moines, and 2.2 mi upstream from Raccoon River.

DRAINAGE AREA.--78.4 mi^2.

PERIOD OF RECORD.--October 1971 to current year.

REVISED RECORDS.--WDR Iowa 1973: 1972. WDR IA-75-1: 1973-74.

GAGE.--Water-stage recorder. Datum of gage is 801.04 ft above NGVD (levels by Iowa Natural Resources Council).

REMARKS.--Estimated daily discharges: Dec. 8 to Mar. 19, and Mar. 21,22. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--18 years, 59.5 ft^3/s, 10.3 in/yr, 43,110 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft^3/s May 10, 1986, gage height, 18.32 ft, from rating curve extended above 3,500 ft^3/s on basis of contracted-opening measurement of peak flow; no flow for many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 15	1815	899	8.69	Aug. 29	0630	642	7.66
May 24	0345	824	8.41	Sept. 9	0130	822	8.36
July 18	0345	*924	*8.76				

No flow part of each day, Aug. 18, 21-22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.1	1.4	2.2	5.0	5.0	.88	3.9	38	8.7	5.6	1.4	3.4
2	3.5	1.6	2.3	4.5	2.5	.94	3.6	13	6.6	5.1	1.2	2.8
3	2.8	1.8	2.0	4.0	3.0	5.0	3.0	12	111	4.5	18	7.3
4	2.1	13	1.3	3.5	2.0	15	2.7	18	39	3.7	6.9	29
5	1.7	3.1	1.3	4.5	1.7	7.0	2.4	12	21	3.2	2.5	5.9
6	1.4	2.6	1.4	3.5	1.5	3.0	2.2	9.6	15	2.9	1.1	3.6
7	1.3	1.8	1.4	3.0	1.4	2.5	7.3	7.9	12	2.4	.86	132
8	1.2	1.4	.90	2.5	1.3	6.0	8.3	6.9	116	2.1	.71	122
9	1.3	1.6	.80	2.0	1.3	15	3.7	6.0	52	1.7	.67	210
10	1.2	2.3	.70	1.5	1.2	40	3.0	5.5	29	1.4	.59	38
11	1.1	1.7	.80	1.7	1.2	20	2.5	4.7	21	67	.54	23
12	1.2	27	1.0	2.0	1.1	12	2.3	4.1	19	11	.32	15
13	1.3	5.3	1.1	2.3	1.4	9.0	2.2	3.8	15	5.5	.22	13
14	1.5	2.3	.90	2.6	1.5	8.2	2.2	3.5	12	3.2	.38	11
15	1.7	129	.65	2.4	1.3	8.0	2.1	3.2	11	18	.53	9.4
16	2.0	25	.80	2.8	1.2	7.8	2.1	2.9	9.3	4.0	.30	8.1
17	2.7	6.8	1.0	3.3	1.1	7.7	2.0	2.6	10	2.1	.19	7.1
18	3.3	4.8	1.5	4.0	1.0	7.4	4.9	27	12	177	.09	6.2
19	3.1	3.9	2.0	3.0	.94	7.2	2.5	12	7.1	28	8.9	6.4
20	4.0	2.9	2.6	2.6	.90	7.1	2.3	5.3	6.2	15	2.1	6.1
21	4.0	2.3	1.3	2.3	.85	6.6	2.2	3.8	5.2	9.3	.42	5.5
22	7.3	1.9	1.1	2.9	.80	5.8	2.2	2.9	4.8	7.1	.09	4.9
23	13	2.1	2.0	2.0	.78	5.4	2.2	2.5	10	7.0	64	4.1
24	2.5	2.0	20	1.7	.76	4.9	2.1	129	6.8	6.3	4.2	4.0
25	1.9	2.5	10	1.5	.80	4.3	2.0	33	61	3.6	5.6	4.2
26	1.6	25	8.0	1.4	.84	4.3	3.3	17	34	6.3	51	3.6
27	1.5	4.2	9.0	1.3	.88	4.5	7.1	11	18	3.9	21	3.5
28	1.4	3.1	7.0	10	.92	4.6	98	22	12	2.1	67	3.3
29	1.4	3.5	4.5	15	---	4.6	23	35	9.2	9.5	101	3.5
30	1.4	3.0	5.0	12	---	5.5	14	13	7.0	4.1	7.9	3.2
31	1.4	---	6.0	10	---	3.8	---	10	---	1.9	4.8	---
TOTAL	80.9	288.9	100.55	120.8	39.17	244.02	221.3	477.2	700.9	424.5	374.51	699.1
MEAN	2.61	9.63	3.24	3.90	1.40	7.87	7.38	15.4	23.4	13.7	12.1	23.3
MAX	13	129	20	15	5.0	40	98	129	116	177	101	210
MIN	1.1	1.4	.65	1.3	.76	.88	2.0	2.5	4.8	1.4	.09	2.8
AC-FT	160	573	199	240	78	484	439	947	1390	842	743	1390
CFSM	.03	.12	.04	.05	.02	.08	.09	.20	.30	.17	.15	.30
IN.	.04	.14	.05	.06	.02	.09	.11	.23	.33	.20	.18	.33

CAL YR 1988 TOTAL 4689.50 MEAN 12.8 MAX 131 MIN .08 AC-FT 9300 CFSM .16 IN. 2.23
WTR YR 1989 TOTAL 3771.85 MEAN 10.3 MAX 210 MIN .09 AC-FT 7480 CFSM .13 IN. 1.77

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IA

LOCATION.--Lat 41°34'30", long 93°35'48", in NE1/4 SE1/4 sec.10, T.78 N., R.24 W., Polk County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on Southeast 14th Street at Des Moines, 0.8 mi downstream from Raccoon River and Scott Street Dam, and at mile 200.7.

DRAINAGE AREA.--9,879 mi^2.

PERIOD OF RECORD.--April 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1943 (P).

GAGE.--Water-stage recorder. Datum of gage is 762.52 ft above NGVD. Prior to Oct. 1, 1951, and Oct. 1, 1953, to Sept. 30, 1959, water-stage recorder upstream of Scott Street Dam, 0.8 mi upstream at datum 11.16 ft higher. Oct. 1, 1951, to Sept. 30, 1953, and Oct. 1, 1959 to Sept. 30, 1961, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Jan. 8, 9, Feb. 3 to Mar. 7. Records good except those for estimated daily discharges, which are poor. Des Moines municipal water supply is taken from infiltration galleries on Raccoon River, 3.5 mi upstream from station. Average daily pumpage was about 58 ft^3/s. At times, water is pumped from Raccoon River into recharge basins, or into Waterworks Reservoir, capacity, 4,800 acre-ft. Effluent from sewage treatment plant enters the river 2.3 mi downstream from station. Net effect diversions not known. Flow regulated by Saylorville Lake (station 05481630) 13.0 mi upstream, since Apr. 12, 1977. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

COOPERATION.--Average monthly pumpage from galleries provided by Des Moines Water Works.

AVERAGE DISCHARGE.--49 years, 4,430 ft^3/s, 6.09 in/yr, 3,210,000 acre-ft/yr; median of yearly mean discharges, 3,580 ft^3/s, 4.9 in/yr, 2,590,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 77,000 ft^3/s June 26, 1947, gage height, 20.8 ft in gage well, 21.6 ft from outside floodmark, site and datum then in use; minimum daily discharge, 26 ft^3/s Jan. 16-29, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1893, that of June 26, 1947, site and datum then in use. Flood of May 31, 1903, reached a stage of 20.9 ft, from flood profile, at Scott Street site and datum, by office of Des Moines City Engineer.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,890 ft^3/s May 26; gage height, 14.44 ft.; minimum daily discharge, 351 ft^3/s Aug. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	610	467	603	506	770	450	2460	1500	2750	2310	467	410
2	683	466	569	542	501	490	2420	1900	2270	2070	461	363
3	840	468	586	484	560	540	2180	2190	2250	1790	502	366
4	905	494	606	505	700	520	1820	2210	2300	1500	506	429
5	936	477	606	496	660	490	1660	1920	3150	1230	464	383
6	845	457	617	506	620	520	1360	1530	3610	868	450	542
7	758	462	603	500	600	490	1240	1330	2790	810	435	1040
8	704	451	535	600	580	475	1030	1060	2290	742	417	1220
9	669	461	455	750	565	564	981	1040	2200	647	420	4440
10	641	475	407	972	540	2070	956	1010	2610	599	401	3690
11	619	456	402	1040	500	3230	932	989	2870	720	394	2270
12	602	523	378	1010	480	4080	961	962	2570	890	386	1700
13	582	471	460	780	450	2850	1100	943	2130	1640	385	1620
14	577	477	505	657	420	2930	1100	926	2290	1920	368	1530
15	570	755	562	575	430	2720	1080	859	1450	2170	364	1200
16	558	696	527	526	440	2740	1070	769	1180	1650	351	999
17	541	812	537	496	420	2470	1020	752	1070	1110	357	827
18	514	723	544	487	410	2130	729	817	1060	1730	361	757
19	507	642	525	474	420	1670	680	705	1100	1700	395	627
20	506	617	533	475	430	1350	652	645	970	1670	391	592
21	507	607	531	472	440	1490	720	642	809	1410	410	572
22	515	593	521	482	420	1930	445	663	698	1270	416	533
23	545	609	538	489	410	1830	482	654	654	1140	621	512
24	912	639	610	490	420	1580	551	1870	678	882	430	503
25	418	642	554	505	440	1670	523	3590	1230	839	394	473
26	361	735	567	497	460	1930	516	6920	1450	764	561	456
27	496	676	611	478	500	1940	595	7380	2110	643	522	448
28	480	633	612	558	470	2170	1380	6140	2820	583	877	436
29	472	620	555	662	---	2590	1430	4670	3060	542	1210	424
30	474	616	528	688	---	2740	1450	3650	2820	460	572	429
31	471	---	533	860	---	2610	---	3400	---	451	439	---
TOTAL	18818	17220	16720	18562	14056	55259	33523	63636	59239	36750	14727	29791
MEAN	607	574	539	599	502	1783	1117	2053	1975	1185	475	993
MAX	936	812	617	1040	770	4080	2460	7380	3610	2310	1210	4440
MIN	361	451	378	472	410	450	445	642	654	451	351	363
AC-FT	37330	34160	33160	36820	27880	109600	66490	126200	117500	72890	29210	59090

CAL YR 1988 TOTAL 621974 MEAN 1699 MAX 6280 MIN 295 AC-FT 1234000
WTR YR 1989 TOTAL 378301 MEAN 1036 MAX 7380 MIN 351 AC-FT 750400

05485640 FOURMILE CREEK AT DES MOINES, IA

LOCATION.--Lat 41°36'50", long 93°32'43", in NE1/4 NE1/4 sec.32, T.79 N., R.23 W., Polk County, Hydrologic Unit 07100008, on right bank 20 ft downstream from bridge on Easton Blvd., 4.4 mi downstream from Muchikinock Creek and 5.0 mi upstream from Des Moines River.

DRAINAGE AREA.--92.7 mi^2.

PERIOD OF RECORD.--October 1971 to current year.

REVISED RECORDS.--WDR IA-75-1: 1974 (P).

GAGE.--Water-stage recorder. Datum of gage is 795.87 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 30 to Mar. 10, and Mar. 16-21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--18 years, 71.3 ft^3/s, 10.4 in/yr, 51,660 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,340 ft^3/s June 9, 1974, gage height, 14.84 ft; no flow for many days in 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Apr. 28	0545	670	7.57	May 24	0545	*731	*7.80

Minimum discharge, 0.65 ft^3/s Oct. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	1.7	2.4	4.1	3.0	1.0	4.5	28	15	4.6	7.9	5.0
2	.99	1.1	2.0	3.6	2.5	1.1	4.8	21	16	4.2	7.0	3.8
3	.82	1.2	2.3	3.4	2.0	5.0	2.8	18	176	3.6	10	3.2
4	.80	2.7	1.8	3.2	2.3	11	2.9	19	65	4.3	11	5.0
5	.86	3.3	1.4	3.9	2.1	5.4	3.6	17	30	4.0	9.3	4.0
6	.97	2.0	1.3	3.4	1.9	3.0	3.5	15	19	3.2	10	3.2
7	1.3	1.5	1.1	2.9	1.8	2.0	5.0	14	14	3.1	6.5	29
8	1.2	1.4	1.0	2.6	1.7	6.0	6.0	13	26	3.1	5.8	86
9	1.2	1.5	.90	2.4	1.7	20	3.8	12	14	3.0	5.6	225
10	1.0	1.4	.80	2.2	1.6	60	3.5	12	12	3.1	4.7	98
11	.97	1.4	.84	1.9	1.5	44	3.8	13	11	10	3.8	51
12	1.7	6.2	1.0	2.2	1.4	26	3.1	12	11	14	3.9	26
13	1.1	5.4	1.3	2.7	1.6	16	2.7	10	9.3	7.5	4.0	21
14	1.6	1.4	1.0	3.2	1.9	12	2.1	10	8.6	6.1	3.0	18
15	1.2	21	.80	2.9	1.7	10	2.7	11	8.4	7.2	3.7	16
16	1.4	24	.86	3.4	1.5	7.0	2.7	9.9	7.0	8.1	5.3	14
17	1.6	4.9	1.0	4.0	1.4	4.4	2.2	9.3	6.7	5.9	7.2	13
18	1.7	3.4	1.5	5.0	1.3	4.0	1.9	23	7.1	55	5.0	11
19	1.8	2.2	2.3	3.8	1.2	4.5	2.2	22	7.0	46	7.2	11
20	2.1	1.8	3.1	3.2	1.1	5.0	2.3	17	6.1	23	10	10
21	2.3	1.7	2.6	2.8	1.0	5.2	1.7	13	5.0	17	2.3	9.6
22	3.5	1.9	2.2	3.4	.96	5.2	2.2	13	4.7	15	13	9.8
23	2.3	1.7	2.8	2.3	.92	6.3	2.1	10	4.9	13	15	9.2
24	1.3	1.9	5.0	2.0	.88	4.5	2.6	293	5.9	12	5.1	8.1
25	1.0	2.1	4.3	1.8	.86	4.4	3.1	108	15	12	4.0	8.2
26	.96	7.4	3.9	1.7	.92	4.4	3.3	46	8.9	12	19	7.8
27	1.0	3.7	4.5	1.5	1.0	4.0	38	27	8.2	11	6.2	7.6
28	1.0	2.3	3.9	3.5	1.1	4.2	244	20	6.2	8.6	6.1	7.2
29	1.0	3.3	3.2	10	---	3.6	55	25	4.4	9.5	105	7.1
30	.81	2.7	3.7	6.0	---	4.2	28	18	4.3	11	20	7.2
31	1.0	---	4.5	3.5	---	4.1	---	16	---	8.5	6.7	---
TOTAL	42.08	118.2	69.30	102.5	42.84	297.5	446.1	895.2	536.7	348.6	333.3	735.0
MEAN	1.36	3.94	2.24	3.31	1.53	9.60	14.9	28.9	17.9	11.2	10.8	24.5
MAX	3.5	24	5.0	10	3.0	60	244	293	176	55	105	225
MIN	.80	1.1	.80	1.5	.86	1.0	1.7	9.3	4.3	3.0	2.3	3.2
AC-FT	83	234	137	203	85	590	885	1780	1060	691	661	1460
CFSM	.01	.04	.02	.04	.02	.10	.16	.31	.19	.12	.12	.26
IN.	.02	.05	.03	.04	.02	.11	.18	.36	.22	.14	.13	.29

CAL YR 1988 TOTAL 4838.61 MEAN 13.2 MAX 64 MIN .05 AC-FT 9600 CFSM .14 IN. 1.94
WTR YR 1989 TOTAL 3967.32 MEAN 10.9 MAX 293 MIN .80 AC-FT 7870 CFSM .12 IN. 1.58

05486000 NORTH RIVER NEAR NORWALK, IA

LOCATION.--Lat 41°27'25", long 93°39'10", in NW1/4 SW1/4 sec.20, T.77 N., R.24 W., Warren County, Hydrologic Unit 07100008, on left bank 10 ft downstream from bridge on county highway R57, 1.7 mi southeast of Norwalk, 5.2 mi upstream from Middle Creek, and 6.2 mi downstream from Badger Creek.

DRAINAGE AREA.--349 mi^2.

PERIOD OF RECORD.--February 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1946. WDR IA-76-1: 1975 (P).

GAGE.--Water-stage recorder. Datum of gage is 788.45 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to June 12, 1946, nonrecording gage at same site and datum. Jan. 7 to Oct. 11, 1960, nonrecording gage at site 2.1 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Oct. 12, 13, Dec. 28 to Jan. 2, Jan. 7-9, Jan. 29 to Feb. 4, Feb. 22 to Mar. 11, and Mar. 20, 21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--49 years, 182 ft^3/s, 7.08 in/yr, 131,900 acre-ft/yr; median of yearly mean discharges, 150 ft^3/s, 5.8 in/yr, 109,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,000 ft^3/s June 13, 1947, gage height, 25.3 ft, from floodmark, from rating curve extended above 9,100 ft^3/s on basis of velocity-area studies; no flow at times during period 1954-58.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 10	0500	*1,500	*16.47				

Minimum daily discharge, 1.4 ft^3/s Nov. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.5	4.4	1.6	2.9	74	7.9	17	25	68	36	9.0	13
2	18	3.5	1.7	2.8	15	8.6	15	29	43	27	35	8.1
3	32	3.2	1.7	2.6	5.0	10	14	35	34	23	18	6.0
4	15	3.0	1.7	2.5	10	9.0	13	26	36	23	11	5.9
5	5.8	2.8	1.9	2.7	19	8.4	12	22	28	22	8.2	5.9
6	4.2	2.6	2.0	3.3	12	8.0	11	18	22	16	6.4	10
7	3.1	2.5	2.1	3.5	9.7	9.0	11	14	19	12	5.4	9.7
8	2.6	2.2	2.0	4.5	8.6	10	12	11	15	11	5.1	29
9	2.3	2.2	2.0	3.9	8.2	15	11	9.6	21	9.1	4.8	1010
10	2.0	2.1	2.2	3.4	8.4	150	10	8.7	91	8.1	4.0	1400
11	2.4	1.9	2.0	3.2	7.5	600	9.6	7.4	45	7.7	3.4	575
12	2.9	2.3	2.0	3.1	7.1	472	9.4	6.5	30	7.6	3.1	260
13	2.9	2.4	2.1	3.0	7.9	187	9.1	6.2	25	16	2.9	160
14	3.3	2.5	2.3	2.9	7.6	107	8.7	5.2	18	11	2.7	115
15	4.1	3.8	2.3	2.8	7.2	69	8.0	4.9	24	7.8	2.6	90
16	3.8	22	2.2	2.6	7.2	51	7.4	4.4	16	6.7	2.6	73
17	3.4	9.1	2.3	2.5	7.1	41	6.7	4.1	13	5.9	2.4	59
18	3.3	5.1	2.4	2.5	6.8	32	6.9	4.5	10	11	2.3	49
19	2.9	6.8	2.4	2.5	6.7	24	6.8	4.8	9.0	51	3.3	40
20	2.7	4.1	2.5	2.5	7.2	22	6.9	6.0	8.2	22	2.9	35
21	2.5	2.9	2.3	2.5	7.4	20	6.6	6.9	7.6	19	2.5	29
22	2.5	2.1	2.3	2.5	6.9	18	6.5	7.1	6.5	17	2.4	25
23	2.7	1.6	2.5	2.5	7.4	22	6.5	5.7	6.4	11	4.0	21
24	2.4	1.5	3.6	2.4	7.9	20	6.5	16	6.5	8.3	3.2	18
25	2.3	1.4	3.3	2.3	8.1	19	6.3	19	10	6.7	2.8	17
26	2.3	1.8	3.5	2.4	8.7	19	6.2	9.7	102	6.3	5.2	16
27	2.3	1.6	4.0	2.4	8.0	19	6.3	6.1	278	5.4	58	12
28	2.4	1.7	3.7	8.0	7.6	20	17	5.8	186	5.1	65	11
29	2.9	2.3	3.6	100	---	19	34	39	87	5.5	46	12
30	2.7	1.9	3.5	164	---	18	37	266	51	4.9	38	12
31	3.0	---	3.2	204	---	18	---	135	---	7.0	27	---
TOTAL	148.2	107.3	76.9	552.7	304.2	2052.9	338.4	768.6	1316.2	430.1	389.2	4126.6
MEAN	4.78	3.58	2.48	17.8	10.9	66.2	11.3	24.8	43.9	13.9	12.6	138
MAX	32	22	4.0	204	74	600	37	266	278	51	65	1400
MIN	2.0	1.4	1.6	2.3	5.0	7.9	6.2	4.1	6.4	4.9	2.3	5.9
AC-FT	294	213	153	1100	603	4070	671	1520	2610	853	772	8190
CFSM	.01	.01	.01	.05	.03	.19	.03	.07	.13	.04	.04	.39
IN.	.02	.01	.01	.06	.03	.22	.04	.08	.14	.05	.04	.44

CAL YR 1988 TOTAL 12708.23 MEAN 34.7 MAX 400 MIN .32 AC-FT 25210 CFSM .10 IN. 1.35
WTR YR 1989 TOTAL 10611.3 MEAN 29.1 MAX 1400 MIN 1.4 AC-FT 21050 CFSM .08 IN. 1.13

05486490 MIDDLE RIVER NEAR INDIANOLA, IA

LOCATION.--Lat 41°25'27", long 93°35'09", in SW1/4 SE1/4 sec.35, T.77 N., R.24 W., Warren County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on county highway, 0.4 mi upstream from Cavitt Creek, 1.5 mi upstream from bridge on U.S. Highway 69, and 4.6 mi northwest of Indianola.

DRAINAGE AREA.--503 mi^2.

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1940 (M), 1941, 1944, 1946, 1949 (M).

GAGE.--Water-stage recorder. Datum of gage is 776.15 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to June 11, 1946, June 9, 1947, to Nov. 23, 1948, and Sept. 8, 1951, to Oct. 30, 1952, nonrecording gage and June 11, 1946, to June 8, 1947 (destroyed by flood), Nov. 24, 1948, to Sept. 7, 1951, Oct. 31, 1952, to Sept. 30, 1962, water-stage recorder at site 1.6 mi downstream at datum 2.81 ft lower.

REMARKS.--Estimated daily discharges: Dec. 9 to Mar. 11. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--49 years, 259 ft^3/s, 7.00 in/yr, 187,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,000 ft^3/s June 13, 1947, gage height, 26.40 ft, from floodmark, former site and datum; 28.27 ft, from floodmark, present site and datum; minimum daily discharge, 0.11 ft^3/s July 2, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	1730	*4,340	*15.22				

Minimum discharge, 2.2 ft^3/s Oct. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	2.9	21	13	35	10	33	27	64	76	73	14
2	34	3.1	23	13	30	12	32	40	49	59	101	17
3	49	3.8	25	13	26	13	31	35	42	49	54	16
4	30	4.0	18	12	29	12	29	31	37	39	38	16
5	19	4.3	20	13	31	11	27	27	24	41	28	17
6	13	4.5	22	14	29	12	26	24	20	34	26	14
7	9.7	4.6	20	17	27	13	26	21	17	28	22	17
8	8.0	4.8	15	20	25	12	27	19	18	25	20	75
9	7.4	5.2	11	23	22	11	24	18	25	21	17	2680
10	6.7	7.2	9.0	25	19	100	21	16	18	19	15	3580
11	5.5	11	10	24	16	800	21	13	47	20	13	1230
12	4.7	16	12	22	14	691	21	12	50	84	11	728
13	4.9	18	13	21	12	350	19	11	32	54	9.8	530
14	3.9	13	12	19	11	226	18	10	24	23	9.2	413
15	3.8	12	11	17	10	159	18	9.7	31	20	8.8	336
16	3.6	84	10	16	11	117	17	9.3	30	17	7.7	282
17	3.6	58	10	15	10	93	17	8.6	22	18	6.7	243
18	4.4	79	11	15	9.6	68	17	11	18	64	6.0	207
19	3.8	136	11	14	9.2	62	17	14	16	152	6.5	178
20	4.0	78	11	14	9.4	54	17	12	14	70	5.7	152
21	4.1	50	12	13	9.6	44	16	9.9	12	108	5.3	130
22	3.7	41	12	13	9.4	45	17	9.9	11	64	5.2	113
23	3.7	35	13	13	9.6	42	17	10	11	42	8.1	97
24	3.3	30	14	12	9.8	40	17	24	10	33	7.1	87
25	3.1	29	13	12	10	38	16	11	22	27	12	79
26	2.8	34	12	12	11	37	15	8.0	331	23	13	71
27	3.0	32	13	11	11	36	16	7.4	266	20	22	65
28	4.8	23	14	11	11	37	22	8.8	299	17	19	63
29	2.7	29	14	16	---	34	23	124	171	24	12	60
30	2.5	26	15	21	---	35	20	249	115	34	14	55
31	2.8	---	14	27	---	34	---	101	---	30	11	---
TOTAL	282.5	878.4	441.0	501	466.6	3248	637	931.6	1846	1335	607.1	11565
MEAN	9.11	29.3	14.2	16.2	16.7	105	21.2	30.1	61.5	43.1	19.6	385
MAX	49	136	25	27	35	800	33	249	331	152	101	3580
MIN	2.5	2.9	9.0	11	9.2	10	15	7.4	10	17	5.2	14
AC-FT	560	1740	875	994	926	6440	1260	1850	3660	2650	1200	22940
CFSM	.02	.06	.03	.03	.03	.21	.04	.06	.12	.09	.04	.77
IN.	.02	.05	.03	.04	.03	.24	.05	.07	.14	.10	.04	.86

CAL YR 1988 TOTAL 22085.9 MEAN 60.3 MAX 800 MIN 1.6 AC-FT 43810 CFSM .12 IN. 1.63
WTR YR 1989 TOTAL 22739.2 MEAN 62.3 MAX 3580 MIN 2.5 AC-FT 45100 CFSM .12 IN. 1.68

05487470 SOUTH RIVER NEAR ACKWORTH, IA

LOCATION.--Lat 41°20'14", long 93°29'10", in SE1/4 SE1/4 sec.34, T.76 N., R.23 W., Warren County, Hydrologic Unit 07100008, on right bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Otter Creek, and 2.2 mi southwest of Ackworth.

DRAINAGE AREA.--460 mi^2.

PERIOD OF RECORD.--February 1940 to current year.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1941, 1945 (M), 1946.

GAGE.--Water-stage recorder. Datum of gage is 769.97 ft above NGVD. Prior to June 12, 1946, nonrecording gage, June 13, 1946, to Apr. 13, 1960, water-stage recorder, and Apr. 14, 1960 to Sept. 30, 1961, nonrecording gage, all at site 4.0 mi downstream at datum 8.06 ft lower.

REMARKS.--Estimated daily discharges: Oct. 23-26, Dec. 8-12, 15, 16, 28, 30, Jan. 7-11, 21, 22, Feb. 1 to Mar. 11, Mar. 18, 19, 21, Apr. 13-18, July 11, 12, Aug. 11-17, Aug. 19 to Sept. 7, and Sept. 28-30. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--49 years, 244 ft^3/s, 7.20 in/yr, 176,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,000 ft^3/s June 5, 1947, gage height, 24.60 ft, site and datum then in use; maximum gage height, 32.85 ft July 5, 1981; no flow Sept. 19 to Oct. 13, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1930 reached a stage of 24.5 ft, from information by local residents, discharge, about 30,000 ft^3/s, at site 4.0 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	1930	*1,800	*11.87				

Minimum daily discharge, 0.99 ft^3/s Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.6	2.8	6.1	7.6	15	2.9	5.2	9.5	43	2.8	4.5	3.1
2	4.6	3.0	5.5	7.8	7.0	3.1	5.3	11	28	3.0	2.2	4.1
3	4.8	3.1	5.5	7.6	3.5	3.3	4.6	9.3	24	3.1	2.4	4.5
4	2.9	3.5	5.1	8.1	3.8	3.1	4.1	8.7	13	2.2	2.3	3.5
5	2.6	3.3	5.6	9.3	4.0	3.0	4.4	7.0	13	1.8	1.6	3.7
6	2.8	5.0	5.5	11	3.8	3.1	4.0	6.0	8.8	1.6	1.4	4.5
7	2.6	4.7	4.6	10	3.6	3.3	4.4	5.0	6.2	1.6	1.2	3.6
8	2.8	3.4	3.7	9.0	3.3	3.2	4.4	4.3	5.0	1.6	1.2	38
9	2.8	3.6	3.6	8.4	3.2	3.1	3.7	3.7	4.9	1.2	1.1	1120
10	2.7	4.1	3.9	9.0	3.1	25	3.6	3.5	4.6	1.2	1.1	844
11	2.4	4.5	4.3	9.6	3.0	60	3.7	3.1	4.8	142	1.2	275
12	2.4	7.2	4.8	10	2.9	87	3.6	3.0	4.5	135	1.1	94
13	2.6	7.5	5.3	11	3.1	49	3.6	2.8	3.1	21	1.0	43
14	2.7	8.4	4.2	13	3.3	31	3.6	2.8	2.9	14	1.1	29
15	2.5	10	3.8	11	3.2	19	4.1	2.7	2.7	12	1.2	17
16	2.4	17	4.8	12	3.1	15	4.3	2.6	2.5	11	1.1	10
17	2.7	11	5.8	12	3.0	12	4.1	2.5	2.5	8.3	1.0	8.0
18	2.4	9.8	7.7	10	2.9	10	4.3	4.5	2.6	32	.99	6.2
19	2.4	8.5	7.2	10	2.9	9.0	4.0	5.8	2.5	13	1.5	4.8
20	2.8	6.8	6.8	8.0	2.8	8.1	3.8	3.3	2.2	9.9	2.1	4.2
21	3.0	5.6	5.8	8.4	2.8	7.4	3.4	3.3	2.0	7.5	2.7	3.4
22	2.9	5.8	7.4	9.0	2.7	6.2	3.3	3.2	2.2	6.9	3.2	3.1
23	2.8	6.2	6.7	7.2	2.8	5.5	3.2	2.7	2.1	7.9	3.3	3.6
24	2.8	6.4	8.0	7.3	2.7	5.4	3.1	99	1.9	14	2.7	3.1
25	2.7	6.0	9.5	6.7	2.8	5.2	3.0	16	9.5	8.3	3.0	3.3
26	2.7	15	8.7	6.3	3.0	5.3	3.5	5.0	35	7.0	3.6	3.3
27	3.4	17	8.4	8.8	3.2	5.8	4.8	3.1	55	6.0	3.9	3.5
28	2.4	9.5	8.2	11	3.0	6.3	8.2	5.0	24	5.5	4.1	3.3
29	2.4	7.9	8.4	44	---	6.6	5.5	409	7.9	6.1	4.4	3.1
30	2.5	7.2	9.0	38	---	5.6	4.6	176	3.8	10	4.1	3.3
31	2.9	---	8.2	28	---	5.1	---	65	---	17	4.4	---
TOTAL	90.0	213.8	192.1	369.1	103.5	417.6	125.4	888.4	324.2	514.5	70.69	2553.2
MEAN	2.90	7.13	6.20	11.9	3.70	13.5	4.18	28.7	10.8	16.6	2.28	85.1
MAX	5.6	17	9.5	44	15	87	8.2	409	55	142	4.5	1120
MIN	2.4	2.8	3.6	6.3	2.7	2.9	3.0	2.5	1.9	1.2	.99	3.1
AC-FT	179	424	381	732	205	828	249	1760	643	1020	140	5060
CFSM	.01	.02	.01	.03	.01	.03	.01	.06	.02	.04	.00	.19
IN.	.01	.02	.02	.03	.01	.03	.01	.07	.03	.04	.01	.21

CAL YR 1988 TOTAL 16768.8 MEAN 45.8 MAX 800 MIN 1.3 AC-FT 33260 CFSM .10 IN. 1.36
WTR YR 1989 TOTAL 5862.49 MEAN 16.1 MAX 1120 MIN .99 AC-FT 11630 CFSM .03 IN. .47

05487500 DES MOINES RIVER NEAR RUNNELLS, IA

LOCATION.--Lat 41°29'19", long 93°20'17", in SE1/4 NW1/4 sec.12, T.77 N., R.22 W., Polk County, Hydrologic Unit 07100008, on left bank 10 ft downstream from bridge on State Highway 316, 0.2 mi downstream from South River River, 0.5 mi upstream from Camp Creek, 2.2 mi southeast of Runnells, 37.2 mi upstream from Red Rock Dam and at mi 179.5.

DRAINAGE AREA.--11,655 mi^2

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 700.00 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Nov. 11-13, Dec. 9-24, Dec. 28 to Mar. 12, Apr. 14-17. Records good except those for estimated daily discharges, which are poor. Flow regulated by Saylorville Lake (station 05481630) 34.2 mi upstream. Stage-discharge relation is affected at times by backwater from Lake Red Rock (05488100). Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 48,000 ft^3/s July 2, 1986; maximum gage height, 57.65 ft Oct. 28, 1986, (backwater from Red Rock); minimum daily discharge, 405 ft^3/s, Oct. 26, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods occurred on May 31, 1903; June 14, 1947; June 26, 1947; and June 24, 1954. No gage height or discharge was determined. Gage height and discharge information is available for these floods at other sites on the Des Moines River.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14,800 ft^3/s Sept. 10, gage height, 48.65; minimum daily discharge, 405 ft^3/s Oct. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	697	468	670	580	700	560	2430	1380	3470	2560	708	699
2	775	467	644	620	580	540	2370	1470	2880	2240	708	650
3	863	477	643	560	540	590	2330	1830	2440	1890	708	596
4	1020	498	652	580	740	650	1940	2190	2420	1660	731	626
5	1040	506	654	570	900	610	1750	2200	2530	1440	715	660
6	1040	497	672	580	840	580	1470	1850	3210	1230	670	616
7	927	488	673	570	790	610	1300	1690	3230	1040	646	811
8	878	488	634	720	760	580	1190	1430	2390	1010	623	1740
9	838	483	540	840	750	560	1050	1340	2120	918	615	4910
10	795	508	460	1000	730	800	984	1300	2260	863	604	13000
11	718	490	440	1100	670	2000	936	1260	2610	823	598	6970
12	683	540	430	1150	620	4500	899	1230	2640	1110	584	3120
13	681	510	480	800	570	3700	950	1200	2180	1270	575	2260
14	682	535	560	700	530	3300	1050	1190	2120	1610	568	1970
15	678	535	620	640	500	2970	1100	1170	1780	1940	573	1680
16	673	1020	600	580	540	2830	1070	1140	1380	1800	565	1360
17	650	824	610	560	520	2760	1080	1100	1280	1390	557	1170
18	627	909	620	540	500	2510	987	1090	1220	1540	558	1030
19	615	814	600	540	490	2140	755	1150	1180	1830	554	899
20	621	757	620	540	510	1680	685	1050	1170	1800	589	802
21	633	715	600	540	530	1480	671	965	1010	1610	568	759
22	631	686	580	550	500	1820	691	945	912	1440	583	731
23	698	679	600	560	480	1940	559	941	837	1370	655	699
24	736	693	640	560	500	1700	561	1710	815	1160	748	679
25	811	704	653	580	480	1600	571	2990	961	1030	597	662
26	405	798	705	560	520	1770	582	5240	1480	987	1170	636
27	451	798	736	540	570	1850	628	8760	1830	879	935	623
28	485	729	700	600	600	1860	1150	7970	2720	800	771	611
29	485	706	640	780	---	2290	1420	6350	3160	763	1380	598
30	485	690	600	780	---	2580	1360	5250	3040	754	1200	593
31	474	---	620	900	---	2610	---	4140	---	709	780	---
TOTAL	21795	19012	18896	20720	16960	55970	34519	73521	61275	41466	21836	52160
MEAN	703	634	610	668	606	1805	1151	2372	2042	1338	704	1739
MAX	1040	1020	736	1150	900	4500	2430	8760	3470	2560	1380	13000
MIN	405	467	430	540	480	540	559	941	815	709	554	593
AC-FT	43230	37710	37480	41100	33640	111000	68470	145800	121500	82250	43310	103500

CAL YR 1988 TOTAL 68965 MEAN 1884 MAX 6760 MIN 405 AC-FT 1368000
WTR YR 1989 TOTAL 43813 MEAN 1200 MAX 13000 MIN 405 AC-FT 869000

05487980 WHITE BREAST CREEK NEAR DALLAS, IA

LOCATION.--Lat 41°14'41", long 93°16'08", in NW1/4 NW1/4 sec.3, T.74 N., R.21 W., Marion County, Hydrologic Unit 07100008, on left bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Kirk Branch, and 1.7 mi northwest of Dallas.

DRAINAGE AREA.--342 mi^2.

PERIOD OF RECORD.--October 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 759.21 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 1-3, 5-18, 20-22, 26-29, Oct. 31 to Nov. 2, Nov. 4-5, Dec. 8-12, 15-22, Dec. 28 to Jan. 5, Feb. 4 to Mar. 13, 18, 19, July 25, 26, July 28 to Aug. 1, Aug. 6-21, Sept. 2-6, and Sept. 26-30. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--27 years, 198 ft^3/s, 7.86 in/yr, 143,400 acre-ft/yr; median of yearly mean discharges, 160 ft^3/s, 6.4 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 37,300 ft^3/s July 16, 1982, gage height, 33.45 ft; minimum daily discharge, 0.03 ft^3/s Aug. 13, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 11, 1962, reached a stage of 28.87 ft, from floodmark, discharge, about 12,000 ft^3/s. Flood of June 6, 1947, may have been slightly higher.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	0330	*4,080	*18.24	No other peak greater than base discharge.			

Minimum daily discharge, 0.03 ft^3/s Aug. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.3	1.8	1.8	2.4	2.8	1.5	6.3	23	38	2.6	.40	16
2	2.7	1.7	2.1	2.3	3.0	1.6	6.2	43	25	2.6	.26	10
3	2.2	1.6	2.3	2.4	1.8	1.7	5.7	26	127	2.6	.26	5.0
4	1.8	1.5	2.5	2.6	2.0	7.0	5.2	20	23	2.3	.22	3.0
5	1.5	1.5	2.6	2.5	2.2	28	5.0	17	12	2.3	.13	2.0
6	1.3	1.6	2.7	2.4	2.4	9.0	4.9	13	7.5	2.3	.10	1.0
7	1.1	1.6	2.8	2.5	2.5	6.0	4.6	10	6.9	1.9	.09	12
8	.86	1.9	2.5	2.3	2.4	5.0	4.4	7.6	6.7	1.8	.08	111
9	.70	1.6	2.4	2.6	2.3	7.0	4.2	6.9	6.7	1.7	.07	2060
10	.62	1.6	2.6	2.7	2.2	20	4.0	7.0	6.3	1.4	.06	860
11	.56	1.6	2.8	2.7	2.1	40	3.8	7.2	7.4	1.3	.05	199
12	.60	1.7	3.0	2.8	2.0	30	3.7	7.6	7.3	3.8	.04	71
13	.74	2.3	3.3	2.9	2.1	21	3.5	7.8	7.0	3.0	.03	37
14	1.0	2.4	3.5	2.9	2.3	17	3.1	8.1	6.6	1.3	.05	25
15	1.2	2.6	3.1	3.1	2.2	12	3.1	7.9	5.2	1.0	.06	19
16	1.3	2.4	3.2	3.1	2.1	8.7	3.2	6.3	4.7	.94	.07	13
17	1.4	1.8	3.3	3.1	2.0	6.3	2.8	5.4	5.4	.64	.08	11
18	1.5	2.8	3.4	3.2	2.0	6.0	2.7	6.6	5.3	.96	.07	8.8
19	1.6	1.8	3.3	3.2	1.9	6.6	2.4	9.4	6.5	.77	.06	9.5
20	1.7	1.8	3.2	3.3	1.9	7.1	2.3	16	4.5	1.1	.10	6.3
21	1.8	1.9	3.0	3.2	1.8	6.8	2.0	17	4.9	1.3	.30	5.1
22	1.7	2.1	3.2	3.5	1.8	7.7	2.1	15	4.1	1.6	.87	4.6
23	1.6	2.3	3.6	3.6	1.9	8.3	2.0	17	4.0	1.6	1.9	3.9
24	1.6	2.3	2.9	3.4	1.8	8.4	1.6	152	3.9	.91	1.8	4.0
25	1.6	2.3	2.7	3.4	1.5	8.3	1.8	29	19	.80	1.5	3.6
26	1.5	2.0	2.8	3.3	1.6	7.9	2.5	9.8	13	.68	4.7	3.1
27	1.5	2.3	2.4	3.2	1.7	7.0	2.9	7.5	4.2	.55	4.1	3.0
28	1.4	2.8	2.3	3.1	1.6	5.7	4.5	7.9	3.2	.50	4.5	2.6
29	1.5	1.8	2.4	29	---	5.5	7.6	652	3.3	.52	5.9	2.7
30	1.6	1.6	2.6	8.4	---	5.7	7.3	172	3.2	.56	5.1	3.5
31	1.7	---	2.5	4.2	---	5.9	---	58	---	.48	75	---
TOTAL	45.18	59.0	86.8	123.3	57.9	318.7	115.4	1393.0	381.8	45.81	107.95	3515.7
MEAN	1.46	1.97	2.80	3.98	2.07	10.3	3.85	44.9	12.7	1.48	3.48	117
MAX	3.3	2.8	3.6	29	3.0	40	7.6	652	127	3.8	75	2060
MIN	.56	1.5	1.8	2.3	1.5	1.5	1.6	5.4	3.2	.48	.03	1.0
AC-FT	90	117	172	245	115	632	229	2760	757	91	214	6970
CFSM	.00	.01	.01	.01	.01	.02	01	.13	.04	.00	.01	.34
IN.	.00	.01	.01	.01	.01	.03	.01	.15	.04	.00	.01	.38

CAL YR 1988 TOTAL 10883.79 MEAN 29.7 MAX 520 MIN .52 AC-FT 21590 CFSM .09 IN. 1.18
WTR YR 1989 TOTAL 6250.54 MEAN 17.1 MAX 2060 MIN .03 AC-FT 12400 CFSM .05 IN. .67

05488100 LAKE RED ROCK NEAR PELLA, IA

LOCATION.--Lat 41°22'11", long 92°58'48", in NE1/4 NW1/4 sec.19, T.76 N., R.18 W., Marion County, Hydrologic Unit 07100008, at outlet works near right end of Red Rock Dam on Des Moines River, 1.4 mi upstream from Lake Creek, 4.5 mi southwest of Pella and at mile 142.3.

DRAINAGE AREA.--12,323 mi^2.

PERIOD OF RECORD.--March 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1969. Storage began in March 1969. Releases controlled through 14 concrete conduits extending through the concrete ogee spillway section into the stilling basin. Inlet invert elevation at 690 ft above NGVD. Maximum design discharge through the conduits is 37,500 ft^3/s but normal flood control operation limits maximum outflow to 30,000 ft^3/s. Spillway section consists of 5 tainter gates, 41 ft wide and 46 ft high, on concrete ogee crest at elevation 736 ft. The storage capacity of the reservoir at full flood-control pool level, 780 ft, is 1,790,000 acre-ft, surface area, 65,500 acres and that of conservation pool level, 728 feet, is 89,000 acre-feet, surface area, 9,980 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Normal operation will maintain an elevation of 728 ft with minimum release of 300 ft^3/s and maximum release of 30,000 ft^3/s during the non-growing season, providing discharges at Ottumwa and Keosauqua do not exceed 30,000 ft^3/s and 35,000 ft^3/s respectively. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 1,765,000 acre-ft June 25, 1984; maximum elevation, 779.61 ft June 25, 1984; minimum daily contents, 43,900 acre-ft May 24, 1985, minimum elevation, 719.68 ft Feb. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 153,000 acre-ft Sept. 9; maximum elevation, 735.6 ft Sept. 9; minimum daily contents, 106,000 acre-ft Oct. 1, 2; minimum elevation, 731.90 ft Oct. 1, 2.

Capacity table (elevation, in feet, and contents, in acre-feet)

722	45,600	740	256,000	760	789,000
725	63,400	745	357,000	765	983,000
730	110,000	750	479,000	770	1,213,000
735	174,000	755	623,000		

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	106000	117000	140000	145000	141000	141000	139000	143000	149000	136000	137000	139000
2	106000	117000	141000	144000	141000	141000	139000	142000	147000	136000	137000	137000
3	108000	117000	141000	144000	138000	141000	139000	142000	146000	136000	137000	137000
4	109000	118000	142000	144000	139000	142000	138000	143000	144000	137000	138000	138000
5	110000	120000	143000	145000	139000	142000	136000	143000	141000	137000	138000	138000
6	111000	118000	144000	145000	140000	141000	136000	141000	141000	137000	137000	139000
7	112000	119000	144000	145000	141000	142000	137000	141000	141000	137000	137000	141000
8	113000	119000	145000	144000	141000	142000	139000	141000	139000	136000	137000	148000
9	113000	120000	145000	143000	142000	143000	140000	142000	137000	136000	136000	153000
10	112000	120000	145000	143000	143000	144000	140000	141000	137000	136000	136000	151000
11	112000	119000	145000	144000	143000	150000	141000	141000	137000	137000	136000	143000
12	111000	122000	145000	144000	143000	152000	141000	141000	138000	138000	136000	139000
13	111000	122000	145000	145000	143000	148000	142000	140000	137000	137000	136000	140000
14	111000	122000	145000	145000	143000	145000	143000	140000	136000	137000	136000	142000
15	113000	125000	144000	145000	143000	142000	144000	140000	136000	138000	136000	144000
16	112000	125000	144000	145000	143000	141000	145000	139000	136000	138000	135000	146000
17	114000	126000	143000	145000	142000	142000	145000	138000	136000	138000	135000	147000
18	113000	128000	143000	145000	142000	142000	146000	139000	137000	140000	135000	147000
19	113000	129000	143000	145000	142000	142000	143000	141000	137000	139000	135000	148000
20	113000	130000	144000	145000	142000	143000	141000	140000	136000	138000	135000	148000
21	114000	130000	144000	145000	143000	142000	140000	139000	137000	137000	135000	148000
22	114000	131000	144000	145000	142000	141000	139000	139000	137000	137000	135000	148000
23	115000	132000	144000	144000	142000	141000	139000	139000	137000	137000	137000	147000
24	115000	133000	145000	144000	142000	140000	140000	142000	137000	137000	137000	148000
25	116000	135000	144000	143000	142000	139000	140000	141000	138000	136000	139000	148000
26	115000	137000	145000	143000	142000	138000	140000	139000	138000	136000	145000	148000
27	117000	139000	145000	143000	142000	140000	142000	136000	138000	136000	144000	148000
28	116000	138000	144000	144000	142000	140000	142000	137000	137000	135000	143000	149000
29	116000	139000	144000	145000	---	139000	142000	136000	137000	137000	143000	149000
30	116000	140000	144000	144000	---	141000	142000	136000	137000	137000	140000	149000
31	117000	---	144000	143000	---	139000	---	148000	---	137000	140000	---
MEAN	113000	126000	144000	144000	142000	142000	141000	140000	139000	137000	138000	145000
MAX	117000	140000	145000	145000	143000	152000	146000	148000	149000	140000	145000	153000
MIN	106000	117000	140000	143000	138000	138000	136000	136000	136000	135000	135000	137000

CAL YR 1988 MEAN 93900 MAX 145000 MIN 72100
WTR YR 1989 MEAN 137000 MAX 153000 MIN 106000

05488200 ENGLISH CREEK NEAR KNOXVILLE, IA

LOCATION.--Lat 41°16'00", long 93°05'00", in NE1/4 NE1/4 SE1/4 sec.16, T.75 N., R.19 W., Marion County, Hydrologic Unit 07100009, on left bank 30 ft from left upstream abutment of bridge on State Highway 92, 3 mi east of Knoxville, and 11.4 mi upstream from mouth at Des Moines River.

DRAINAGE AREA.--90.1 mi^2.

PERIOD OF RECORD.--July 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 721.79 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 3 to Nov. 8, Dec. 2-15, Dec. 20 to Jan 13, Jan. 17-19, Feb. 18 to Mar. 10, Mar. 15-17, May 4-22, June 2, 4-24, June 27 to July 11, July 17, July 20 to Aug. 22, Sept. 3-6, and Sept. 18-26. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,270 ft^3/s May 17, 1986, gage height, 21.76 ft; no flow for several days in 1988 and 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 16, 1982 reached a stage of 30.28 ft, gage datum, discharge 28,000 ft^3/s, from contracted-opening indirect computations.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 600 ft^3/s and maximum (*);

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	0700	*1,370	*18.74	No other peak greater than base discharge.			

No flow Aug. 8-13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.0	.16	.52	.42	.35	.48	1.2	6.3	1.9	.60	.04	26
2	1.0	.15	.45	.40	.36	.49	.94	3.0	1.5	.45	.03	3.3
3	.70	.14	.35	.38	.37	.52	1.0	.86	34	.40	.02	1.5
4	.52	.13	.30	.37	.37	1.7	.97	.70	13	.30	.02	.70
5	.38	.12	.27	.39	.44	6.0	.89	.80	6.0	.20	.01	.40
6	.30	.11	.24	.40	.48	2.5	.79	.60	2.7	.15	.01	.25
7	.18	.12	.21	.41	.56	1.8	.72	.50	1.0	.10	.01	3.8
8	.15	.13	.19	.42	.61	1.0	.90	.45	1.1	.07	.00	136
9	.13	.13	.18	.42	.50	3.0	.92	.39	.90	.05	.00	1240
10	.12	.18	.19	.39	.50	6.0	.82	.35	.70	.04	.00	411
11	.11	.15	.19	.37	.53	10	.75	.31	1.1	.05	.00	37
12	.10	.98	.21	.34	.52	4.6	.72	.27	1.8	.89	.00	24
13	.09	.75	.20	.32	.56	1.6	.80	.25	1.1	.40	.00	17
14	.11	.33	.19	.30	.56	1.2	.93	.23	.90	.21	.01	13
15	.20	.35	.18	.37	.60	1.1	.93	.26	.78	.11	.01	9.7
16	.28	.81	.18	.31	.58	1.0	.85	.20	.70	.03	.02	7.3
17	.33	.55	.19	.35	.54	.90	.73	.15	.64	.01	.03	5.7
18	.38	.55	.20	.32	.53	.80	.59	.11	.90	1.5	.02	5.0
19	.34	.49	.24	.31	.52	.90	.54	2.0	.70	.53	.02	4.0
20	.39	.31	.29	.30	.51	1.1	.45	.90	.60	.35	.04	3.5
21	.43	.27	.31	.29	.50	1.1	.41	.60	.54	.25	.03	3.0
22	.46	.21	.35	.31	.49	1.4	.39	.50	.50	.15	.40	2.7
23	.50	.15	.39	.34	.50	1.5	.39	13	.54	.15	15	2.5
24	.52	.15	.42	.34	.48	1.5	.38	23	.42	.11	15	2.2
25	.40	.15	.44	.34	.55	1.3	.40	3.8	7.2	.08	14	2.0
26	.30	3.1	.46	.34	.52	1.4	1.1	.48	7.3	.08	42	1.7
27	.25	3.7	.48	.34	.49	1.6	2.3	.68	3.0	.08	28	1.5
28	.23	5.4	.50	.76	.47	1.7	4.7	1.6	1.7	.07	5.1	1.1
29	.21	2.1	.48	7.9	---	1.9	1.9	3.2	1.0	.06	2.8	.72
30	.19	.80	.46	1.8	---	2.1	2.4	3.9	.70	.05	3.2	.37
31	.17	---	.44	.37	---	1.4	---	.96	---	.06	5.4	---
TOTAL	15.47	22.67	9.70	20.42	13.99	63.59	30.81	70.35	94.92	7.58	131.22	1966.94
MEAN	.50	.76	.31	.66	.50	2.05	1.03	2.27	3.16	.24	4.23	65.6
MAX	6.0	5.4	.52	7.9	.61	10	4.7	23	34	1.5	42	1240
MIN	.09	.11	.18	.29	.35	.48	.38	.11	.42	.01	.00	.25
AC-FT	31	45	19	41	28	126	61	140	188	15	260	3900
CFSM	.01	.01	.00	.01	.01	.02	.01	.03	.04	.00	.05	.73
IN.	.01	.01	.00	.01	.01	.02	.01	.03	.04	.00	.05	.81

CAL YR 1988 TOTAL 2663.69 MEAN 7.28 MAX 100 MIN .00 AC-FT 5280 CFSM .08 IN. 1.10
WTR YR 1989 TOTAL 2447.66 MEAN 6.71 MAX 1240 MIN .00 AC-FT 4850 CFSM .07 IN. 1.01

05488500 DES MOINES RIVER NEAR TRACY, IA

LOCATION.--Lat 41°16'53", long 92°51'34", in NW1/4 SE1/4 sec.19, T.75 N., R.17 W., Mahaska County, Hydrologic Unit 07100009, on right bank 250 ft upstream from abandoned Bellefountaine Bridge, 0.8 mi east of Tracy, 3.1 mi upstream from Cedar Creek, 3.8 mi downstream from bridge on newly located State Highway 92, 6.4 mi downstream from English Creek, and at mile 130.4.

DRAINAGE AREA.--12,479 mi^2.

PERIOD OF RECORD.--March, 1920 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: Drainage area. WSP 1508: 1920 (M), 1922 (M), 1933.

GAGE.--Water-stage recorder. Datum of gage is 670.91 ft above NGVD. Prior to June 26, 1940, and June 30, 1952, to Nov. 4, 1960, nonrecording gage, and June 27, 1940, to June 29, 1952, water-stage recorder, at site 250 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Dec. 11, 12, 15-18, Dec. 27 to Jan. 2, Jan. 4, 8-11, Feb. 3-10, 12, 13, 15-27, and Mar. 5, 6. Records good except those for periods of estimated daily discharges, which are fair. Flow regulated by Lake Red Rock (station 05488100) 11.9 mi upstream, since March 12, 1969. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers gage-height telemeter and data collection platform at station.

AVERAGE DISCHARGE.--69 years, 5,043 ft^3/s, 5.49 in/yr, 3,654,000 acre-ft/yr; median of yearly mean discharges, 4,160 ft^3/s, 4.5 in/yr, 3,010,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 155,000 ft^3/s, June 14, 1947, gage height, 26.5 ft; minimum daily discharge, 40 ft^3/s Jan. 29 to Feb. 1, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1851, that of June 14, 1947. Flood of May 31, 1903, reached a stage of about 25 ft, discharge, about 130,000 ft^3/s. Minimum daily discharge since at least 1910, that of Jan. 29 to Feb. 1, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,200 ft^3/s Sept. 10, gage height, 8.85 ft; minimum daily discharge, 324 ft^3/s Nov. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	411	344	338	650	1930	599	2470	1540	3290	2810	425	1190
2	403	344	340	650	1230	599	2480	1980	3290	2560	423	1020
3	390	335	339	669	800	601	2480	2310	3300	1920	423	590
4	382	336	339	660	600	610	2480	2100	3340	1200	422	406
5	384	338	342	697	500	620	2280	2090	3290	1180	420	381
6	507	324	350	692	450	620	1740	2100	3280	1170	416	373
7	415	333	346	640	435	614	1210	1800	3280	1160	417	411
8	389	331	341	660	430	613	660	1260	3270	1090	414	907
9	564	345	345	640	430	613	629	1250	2960	921	408	4070
10	987	338	354	620	560	732	622	1240	2370	751	365	12600
11	879	339	360	620	799	1490	597	1250	2390	635	363	12200
12	835	369	360	628	820	3800	628	1260	2600	915	366	6870
13	632	344	446	612	820	5950	629	1260	2820	1190	366	2410
14	411	338	628	606	736	5520	686	1270	2400	1550	363	1770
15	403	365	665	604	780	4100	798	1260	1970	1570	363	872
16	400	367	660	604	800	3200	807	1260	1490	1570	363	840
17	399	345	655	603	720	2880	803	1250	1210	1530	363	829
18	388	347	650	605	620	2200	937	1140	1210	1380	363	823
19	393	348	644	640	600	1760	1500	876	1200	1820	376	820
20	396	340	620	710	600	1370	1630	832	1180	2130	369	817
21	386	340	602	713	600	1580	940	818	964	1860	363	816
22	387	347	609	716	600	1980	814	807	824	1390	363	823
23	396	343	605	716	610	1980	818	804	811	1390	417	751
24	380	347	609	716	620	1980	756	1290	807	1380	378	580
25	393	347	601	723	620	1980	628	2630	832	1310	372	444
26	395	380	619	719	600	1980	638	4620	1090	755	690	436
27	397	355	640	720	600	1840	725	7160	1850	796	1310	438
28	348	341	660	734	601	1570	1050	7610	2450	632	1390	439
29	352	346	650	832	---	1890	1420	5000	2800	449	1590	439
30	351	336	650	1340	---	2460	1420	3750	2800	438	1980	449
31	347	---	650	1970	---	2460	---	2900	---	429	1670	---
TOTAL	14100	10352	16017	22709	19511	60191	35275	66717	65368	39981	18311	55814
MEAN	455	345	517	733	697	1942	1176	2152	2179	1290	591	1860
MAX	987	380	665	1970	1930	5950	2480	7610	3340	2810	1980	12600
MIN	347	324	338	603	430	599	597	804	807	429	363	373
AC-FT	27970	20530	31770	45040	38700	119400	69970	132300	129700	79300	36320	110700

CAL YR 1988 TOTAL 687748 MEAN 1879 MAX 6090 MIN 324 AC-FT 1364000
WTR YR 1989 TOTAL 424346 MEAN 1163 MAX 12600 MIN 324 AC-FT 841700

05489000 CEDAR CREEK NEAR BUSSEY, IA

LOCATION.--Lat 41°13'09", long 92°54'38", at SW corner sec.11, T.74 N., R.18 W., Marion County, Hydrologic Unit 07100009, on left bank 10 ft downstream from bridge on State Highway 156, 0.8 mi downstream from North Cedar Creek, 1.6 mi northwest of Bussey, 3.0 mi upstream from Honey Creek, and 8.9 mi upstream from mouth.

DRAINAGE AREA.--374 mi^2.

PERIOD OF RECORD.--October 1947 to current year.

REVISED RECORDS.--WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 682.15 ft above NGVD (levels by U.S. Army Corps of Engineers). Prior to Feb. 21, 1949, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Oct. 27 to Nov. 2, Dec. 15-17, 27, 28, 31, Jan. 5-9, Feb. 2 to Mar. 17, and June 30 to July 4. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform and gage-height telemeter at station.

AVERAGE DISCHARGE.--42 years, 213 ft^3/s, 7.73 in/yr, 154,300 acre-ft/yr; median of yearly mean discharges, 180 ft^3/s, 6.5 in/yr, 130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 96,000 ft^3/s July 3 1982, gage height, 34.61 ft; no flow Sept. 6-20, 1955, Oct. 11, 12, 1956, Aug. 12, 13, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1946 reached a stage of 28.45 ft on upstream side and 28.05 ft on downstream side of bridge, levels to floodmarks by U.S. Army Corps of Engineers, discharge, 31,500 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	2330	*5,710	*19.17	No other peak greater than base discharge.			

No flow, Aug. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	.82	4.8	2.6	28	1.9	7.6	21	19	2.0	.38	305
2	6.8	.78	4.0	2.4	12	2.0	7.6	63	13	1.6	.34	96
3	3.2	.74	4.0	2.3	8.0	2.1	7.0	52	52	1.6	.32	36
4	2.3	.67	3.0	2.4	5.4	9.0	6.4	34	27	.65	.29	12
5	1.4	.62	3.1	2.5	4.0	50	5.4	20	8.2	.34	.25	4.1
6	.84	.63	3.1	2.6	3.6	17	5.2	14	4.0	.27	.19	1.9
7	.66	.69	3.1	2.7	3.3	10	4.7	9.3	2.6	.24	.11	3.9
8	.56	.68	2.9	2.7	3.1	8.0	4.8	5.6	2.9	.19	.07	682
9	.53	.98	2.6	2.6	2.9	13	4.9	5.2	2.6	.17	.06	4390
10	.49	1.8	2.5	2.6	2.8	35	5.1	3.9	2.1	.10	.06	1810
11	.38	2.9	2.4	2.5	2.7	80	5.3	3.3	5.8	.21	.04	257
12	.36	2.1	2.0	2.5	2.6	64	5.2	2.8	6.0	39	.00	153
13	.31	4.4	1.9	2.5	2.5	50	4.8	2.5	4.0	55	.00	104
14	.35	3.0	2.0	2.5	2.5	40	4.1	2.3	2.9	25	.03	79
15	.90	7.4	1.9	3.4	2.4	32	4.0	2.4	2.6	11	.06	59
16	1.1	20	1.8	3.4	2.4	27	4.0	1.2	2.4	7.4	.06	46
17	1.3	7.5	1.7	2.9	2.3	22	3.9	.90	2.3	4.4	.06	34
18	1.5	3.9	1.6	2.9	2.2	18	4.3	.73	2.7	13	.02	25
19	1.3	3.6	1.8	3.1	2.2	15	6.1	3.6	2.8	8.1	.05	19
20	1.5	5.3	2.6	3.5	2.2	14	5.3	4.7	2.5	4.7	.12	16
21	1.7	3.4	2.6	3.5	2.1	11	4.9	11	2.4	1.8	.11	12
22	1.8	2.7	2.7	3.5	2.0	8.4	3.7	3.9	2.4	1.2	.06	11
23	2.0	2.4	2.8	3.5	1.9	7.6	3.5	2.1	2.9	1.1	2.6	10
24	1.7	2.5	3.4	3.5	2.1	6.7	3.5	70	1.4	.75	2.0	8.7
25	1.6	2.6	3.7	3.6	1.9	6.9	6.8	78	5.1	.77	.70	7.7
26	1.2	10	3.3	4.2	2.0	6.5	4.0	32	11	.67	4.5	9.4
27	1.1	12	3.5	4.7	2.1	8.2	4.5	13	9.6	.52	10	6.8
28	1.0	9.5	3.3	5.8	2.0	13	5.4	5.8	5.4	.49	18	6.0
29	.95	6.5	3.1	15	---	13	4.9	6.4	3.6	.50	7.0	6.2
30	.90	6.0	2.9	32	---	14	6.7	29	2.8	.56	2.4	8.9
31	.86	---	2.8	33	---	8.6	---	14	---	.48	207	---
TOTAL	62.59	126.11	86.9	166.9	113.2	613.9	153.6	517.63	214.0	183.81	256.88	8219.6
MEAN	2.02	4.20	2.80	5.38	4.04	19.8	5.12	16.7	7.13	5.93	8.29	274
MAX	22	20	4.8	33	28	80	7.6	78	52	55	207	4390
MIN	.31	.62	1.6	2.3	1.9	1.9	3.5	.73	1.4	.10	.00	1.9
AC-FT	124	250	172	331	225	1220	305	1030	424	365	510	16300
CFSM	.01	.01	.01	.01	.01	.04	.01	.04	.02	.02	.02	.73
IN.	.01	.01	.01	.02	.01	.05	.02	.05	.02	.02	.03	.82

CAL YR 1988 TOTAL 14701.39 MEAN 40.2 MAX 720 MIN .31 AC-FT 29160 CFSM .11 IN. 1.46
WTR YR 1989 TOTAL 10715.12 MEAN 29.4 MAX 4390 MIN .00 AC-FT 21250 CFSM .08 IN. 1.06

05489500 DES MOINES RIVER AT OTTUMWA, IA

LOCATION.--Lat 41°00'39", long 92°24'40", in SE1/4 NE1/4 sec.25, T.72 N., R.14 W., Wapello County, Hydrologic Unit 07100009, on right bank 15 ft downstream from Wabash Railroad Bridge at Ottumwa, 0.4 mi downstream from Ottumwa powerplant, 6.5 mi upstream from Village Creek, 9.5 mi downstream from South Avery Creek, and at mile 94.1.

DRAINAGE AREA.--13,374 mi^2.

PERIOD OF RECORD.--March 1917 to current year (published as "at Eldon" October 1930 to March 1935). Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 525: 1917-20. WSP 1308: 1917-23 (M), 1925-27 (M), 1931. WSP 1438: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 622.00 ft above NGVD. Prior to Sept. 30, 1930, nonrecording gage at Market Street Bridge 1,700 ft upstream at datum 0.83 ft higher. Oct. 1, 1930, to Mar. 31, 1935, nonrecording gage at Eldon 15 mi downstream at different datum. Apr. 1, 1935, to Oct. 25, 1963, water-stage recorder at site 1,100 ft downstream at Vine Street Bridge at datum 0.77 ft higher.

REMARKS.--Estimated daily discharges: Jan. 7, 8, and Feb. 4-14, 16-26. Records good except those for estimated daily discharges, which are poor. Prior to Dec. 12, 1958, and since Nov. 30, 1960, diurnal fluctuation at low and medium stages are caused by powerplant upstream of station about 1/2 mile. Flow regulated by Lake Red Rock (station 05488100) 48.2 mi upstream, since March 12, 1969. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--72 years, 5,466 ft^3/s, 5.55 in/yr, 3,960,000 acre-ft/yr; median of yearly mean discharges, 4,610 ft^3/s, 4.7 in/yr, 3,340,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 135,000 ft^3/s June 7, 1947, gage height, 20.2 ft, site and datum then in use; minimum daily discharge, 30 ft^3/s Jan. 27-29, 31, Feb. 2, 3, 5-7, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1850, that of June 7, 1947. Flood of May 31, 1903, reached a stage of 19.4 ft, former site and datum at Vine Street Bridge or about 22 ft at Market Street Bridge, from information by U.S. Army Corps of Engineers and U.S. National Weather Service, discharge, about 140,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14,500 ft^3/s Sept. 10, gage height, 6.39 ft; minimum daily discharge 84 ft^3/s Dec. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	440	452	345	675	2030	639	2850	1660	3430	3050	622	2100
2	459	384	486	648	1980	699	2760	1810	3840	3130	450	1610
3	342	385	405	633	742	681	2640	2080	4470	2510	469	1160
4	379	402	387	718	580	868	2810	2470	3560	1940	663	789
5	364	392	419	726	660	1210	2720	2260	3550	1070	449	427
6	400	371	422	665	580	883	2300	2210	3690	1110	476	643
7	473	382	415	780	520	902	1830	2100	3540	1380	413	436
8	405	466	417	750	490	829	1260	1660	3540	1100	521	1720
9	387	474	322	658	490	723	608	1140	3550	1030	425	10000
10	518	392	395	911	540	1030	691	1220	2830	918	362	12400
11	883	391	84	846	620	1160	677	1220	2730	780	500	13100
12	625	475	388	731	760	2140	624	1220	2950	2540	483	10100
13	635	445	240	531	870	5490	603	1220	3120	1240	436	4820
14	934	374	607	834	640	6040	688	1210	3090	1440	416	2700
15	432	584	577	620	479	5010	632	912	2500	1940	326	1870
16	451	593	454	597	700	3390	735	1290	1900	1690	581	824
17	497	450	688	609	810	3550	840	1250	1430	1700	156	1330
18	293	463	701	691	710	2810	748	1270	1360	1680	460	836
19	439	433	779	637	630	2380	1040	1390	1260	1830	604	922
20	406	388	780	609	500	1840	1770	899	1190	2210	146	964
21	489	421	676	659	600	1360	1430	763	1240	2300	468	1020
22	402	376	684	688	660	1800	1050	843	868	1730	447	927
23	392	372	642	690	700	2260	741	825	867	1550	528	847
24	455	513	710	716	680	2220	827	1460	998	1520	507	770
25	408	370	724	657	600	2040	683	2240	779	1530	596	795
26	399	506	528	620	640	2020	654	3420	1540	1090	365	532
27	444	478	720	661	767	2230	658	5620	2160	1050	1050	511
28	414	401	576	697	716	2100	746	8150	2290	676	1520	504
29	374	433	469	762	---	1650	1090	6030	2950	850	1560	482
30	316	349	768	903	---	2150	1300	4760	3070	467	1910	489
31	404	---	724	1590	---	2760	---	3520	---	440	3110	---
TOTAL	**14459**	**12915**	**16532**	**22512**	**20694**	**64864**	**38005**	**68122**	**74352**	**47491**	**21019**	**75628**
MEAN	**466**	**430**	**533**	**726**	**739**	**2092**	**1267**	**2197**	**2478**	**1532**	**678**	**2521**
MAX	**934**	**593**	**780**	**1590**	**2030**	**6040**	**2850**	**8150**	**4470**	**3130**	**3110**	**13100**
MIN	**293**	**349**	**84**	**531**	**479**	**639**	**603**	**763**	**779**	**440**	**146**	**427**
AC-FT	**28680**	**25620**	**32790**	**44650**	**41050**	**128700**	**75380**	**135100**	**147500**	**94200**	**41690**	**150000**

CAL YR 1988 TOTAL 785944 MEAN 2147 MAX 6910 MIN 84 AC-FT 1559000
WTR YR 1989 TOTAL 476593 MEAN 1306 MAX 13100 MIN 84 AC-FT 945300

05490500 DES MOINES RIVER AT KEOSAUQUA, IA

LOCATION.--Lat 40°43'40", long 91°57'34", in SE1/4 SW1/4 sec.36, T.69 N., R.10 W., Van Buren County, Hydrologic Unit 07100009, on right bank 10 ft upstream from bridge on State Highway 1 at Keosauqua, 4.0 mi downstream from Chequest Creek, and at mile 51.3.

DRAINAGE AREA.--14,038 mi^2.

PERIOD OF RECORD.--May 1903 to July 1906, April to December 1910, August 1911 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 525: 1913-20. WSP 1438: Drainage area. WSP 1508: 1903, 1905-6, 1915-18 (M), 1922 (M), 1924-26 (M), 1932-34 (M), 1937, 1942 (M).

GAGE.--Water-stage recorder. Datum of gage is 547.36 ft above NGVD. Prior to Dec. 24, 1933, nonrecording gage, and Dec. 25, 1933, to Sept. 30, 1972, water-stage recorder, at same site at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Dec. 12-23, Jan. 16-20, and Feb. 6 to Mar. 12. Records good except those for estimated daily discharges, which are poor. Prior to Dec. 21, 1958, and since Nov. 30, 1960, some diurnal fluctuation at medium and low stages caused by power plant at Ottumwa. Flow regulated by Lake Red Rock (station 05488100) 91.0 mi upstream, since March 12, 1969. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--80 years (water years 1904-05, 1912-89), 5,843 ft^3/s, 5.65 in/yr, 4,230,000 acre-ft/yr; median of yearly mean discharges, 4,990 ft^3/s, 4.8 in/yr, 3,620,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 146,000 ft^3/s June 1, 1903, gage height, 27.85 ft, from floodmark, datum then in use; minimum daily discharge, 40 ft^3/s Jan. 30, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1, 1851, reached a stage of 24 ft, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 15,700 ft^3/s Sept. 9, maximum gage height, 15.75 ft Sept. 9, backwater from ice; minimum daily discharge, 247 ft^3/s Aug. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	440	452	345	675	2030	639	2850	1660	3430	3050	622	2100
2	459	384	486	648	1980	699	2760	1810	3840	3130	450	1610
3	342	385	405	633	742	681	2640	2080	4470	2510	469	1160
4	379	402	387	718	580	868	2810	2470	3560	1940	663	789
5	364	392	419	726	660	1210	2720	2260	3550	1070	449	427
6	400	371	422	665	580	883	2300	2210	3690	1110	476	643
7	473	382	415	780	520	902	1830	2100	3540	1380	413	436
8	405	466	417	750	490	829	1260	1660	3540	1100	521	1720
9	387	474	322	658	430	723	608	1140	3550	1030	425	10000
10	518	392	395	911	540	1030	691	1220	2890	918	362	12400
11	883	391	84	846	620	1160	677	1220	2730	780	500	13100
12	825	475	388	731	760	2140	624	1220	2950	2540	483	10100
13	635	445	240	531	870	5490	603	1220	3120	1240	436	4820
14	934	374	607	834	640	6040	688	1210	3090	1440	416	2700
15	432	584	577	620	479	5010	632	912	2500	1940	326	1870
16	451	593	454	597	700	3390	735	1290	1900	1690	581	824
17	497	450	688	609	810	3550	840	1250	1430	1700	156	1330
18	293	463	701	691	710	2810	748	1270	1360	1680	460	836
19	439	433	779	637	630	2380	1040	1390	1260	1830	604	922
20	406	388	780	609	500	1840	1770	899	1190	2210	146	964
21	489	421	676	659	600	1360	1430	763	1240	2300	468	1020
22	402	376	684	688	660	1800	1050	843	868	1730	447	927
23	392	372	642	690	700	2260	741	825	867	1550	528	847
24	455	513	710	716	680	2220	827	1460	998	1520	507	770
25	408	370	724	657	600	2040	683	2240	779	1530	596	795
26	399	506	528	620	640	2020	654	3420	1540	1090	365	532
27	444	478	720	661	767	2230	658	5620	2160	1050	1050	511
28	414	401	576	697	716	2100	746	8150	2290	676	1520	504
29	374	433	469	762	---	1650	1090	6030	2950	850	1560	482
30	316	349	768	903	---	2150	1300	4760	3070	467	1910	489
31	404	---	724	1590	---	2760	---	3520	---	440	3110	---
TOTAL	**14459**	**12915**	**16532**	**22512**	**20694**	**64864**	**38005**	**68122**	**74352**	**47491**	**21019**	**75628**
MEAN	**466**	**430**	**533**	**726**	**739**	**2092**	**1267**	**2197**	**2478**	**1532**	**678**	**2521**
MAX	**934**	**593**	**780**	**1590**	**2030**	**6040**	**2850**	**8150**	**4470**	**3130**	**3110**	**13100**
MIN	**293**	**349**	**84**	**531**	**479**	**639**	**603**	**763**	**779**	**440**	**146**	**427**
AC-FT	**28680**	**25620**	**32790**	**44650**	**41050**	**128700**	**75380**	**135100**	**147500**	**94200**	**41690**	**150000**

CAL YR 1988 TOTAL 785944 MEAN 2147 MAX 6910 MIN 84 AC-FT 1559000
WTR YR 1989 TOTAL 476593 MEAN 1306 MAX 13100 MIN 84 AC-FT 945300

MISSOURI RIVER BASIN

BIG SIOUX RIVER BASIN

06483500 ROCK RIVER NEAR ROCK VALLEY, IA

LOCATION.--Lat 43°12'52", long 96°17'39", in SW1/4 SW1/4 sec.16, T.97 N., R.46 W., Sioux County, Hydrologic Unit 10170204, on left bank 3 ft upstream from bridge on county highway K30, 0.3 mi north of Rock Valley and at mile 19.1.

DRAINAGE AREA.--1,592 mi^2.

PERIOD OF RECORD.--June 1948 to current year.

REVISED RECORDS.--WSP 1439: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,222.54 ft above NGVD. Prior to Aug. 13, 1952, nonrecording gage with supplementary water-stage recorder operating above 6.2 ft gage height. June 4, 1949 to Aug. 12, 1952 and Aug. 13, 1952 to May 4, 1976, water-stage recorder, at site 3.2 mi downstream at datum 10.73 ft lower.

REMARKS.--Estimated daily discharges: Nov. 10, 16-22, Nov. 27 to Mar. 10, and Mar. 15-23. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--41 years, 412 ft^3/s, 3.51 in/yr, 298,500 acre-ft/yr; median of yearly mean discharges, 300 ft^3/s, 2.6 in/yr, 217,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,400 ft^3/s Apr. 7, 1969, gage height, 17.32 ft, site and datum then in use; no flow for many days during winter period in 1959 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1897 reached a stage of 17.0 ft, former site and datum, discharge not determined, from information by State Highway Commission.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	0015	*3,340	*11.39	No other peak greater than base discharge.			

Minimum daily discharge, 5.4 ft^3/s Feb. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	70	34	30	22	19	12	345	296	159	209	47	29
2	64	35	80	17	9.0	10	310	263	141	168	43	26
3	55	36	88	19	5.4	9.4	288	234	125	142	40	25
4	50	41	58	21	6.0	8.0	265	213	112	156	36	30
5	45	50	74	32	7.0	7.0	245	193	102	139	33	29
6	43	52	84	25	8.0	7.2	231	173	93	122	30	29
7	41	54	62	18	9.9	8.5	218	161	83	107	29	46
8	40	53	30	14	8.0	40	215	152	75	94	27	69
9	39	54	19	15	9.0	125	201	140	69	81	24	67
10	35	46	15	15	14	350	192	129	64	72	22	68
11	34	48	12	16	17	2670	186	121	59	66	21	57
12	32	54	30	17	18	2910	178	111	54	99	21	49
13	33	59	50	19	18	1610	174	104	50	159	21	44
14	34	60	24	23	17	972	164	99	49	209	21	40
15	32	62	15	22	15	540	159	94	49	223	20	36
16	30	40	20	22	14	310	153	89	47	169	18	30
17	32	28	25	23	14	180	148	82	46	145	17	28
18	33	50	37	32	12	160	143	83	51	186	16	25
19	31	46	33	40	10	340	139	87	47	174	16	24
20	32	33	30	27	11	250	135	83	42	147	20	25
21	30	36	28	33	9.4	265	133	78	41	127	27	28
22	30	50	33	54	7.3	285	128	76	41	113	27	27
23	30	72	31	42	6.5	340	124	91	42	101	58	25
24	31	78	29	40	11	1000	124	80	46	91	49	24
25	30	81	26	30	29	1570	130	731	54	82	30	24
26	32	88	27	19	27	1140	126	763	80	72	59	23
27	30	200	25	22	22	835	137	414	110	61	123	21
28	29	27	23	31	16	683	263	277	370	52	65	20
29	30	75	21	45	---	557	298	210	382	64	49	20
30	31	50	23	66	---	461	311	173	276	70	40	22
31	34	---	30	58	---	391	---	164	---	60	33	---
TOTAL	1142	1692	1112	879	369.5	18046.1	5863	5964	2959	3760	1082	1010
MEAN	36.8	56.4	35.9	28.4	13.2	582	195	192	98.6	121	34.9	33.7
MAX	70	200	88	66	29	2910	345	763	382	223	123	69
MIN	29	27	12	14	5.4	7.0	124	76	41	52	16	20
AC-FT	2270	3360	2210	1740	733	35790	11630	11830	5870	7460	2150	2000
CFSM	.02	.04	.02	.02	.01	.37	.12	.12	.06	.08	.02	.02
IN.	.03	.04	.03	.02	.01	.42	.14	.14	.07	.09	.03	.02

CAL YR 1988 TOTAL 85096 MEAN 233 MAX 1750 MIN 11 AC-FT 168800 CFSM .15 IN. 1.99
WTR YR 1989 TOTAL 43878.6 MEAN 120 MAX 2910 MIN 5.4 AC-FT 87030 CFSM .08 IN. 1.03

06485500 BIG SIOUX RIVER AT AKRON, IA
(National stream-quality accounting network station)

LOCATION.--Lat 42°50'14", long 96°33'41", in SW1/4SE1/4SW1/4 sec.30, T.93 N., R.48 W., Plymouth County, on left bank 15 ft downstream from Iowa Highway 403 bridge, 0.5 mi northwest of Akron, and 2.9 mi upstream from Union Creek.

DRAINAGE AREA.--8,424 mi^2, approximately, of which about 1,487 mi^2 is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1928 to current year.

REVISED RECORDS.--WSP 1309: 1929(M), 1931-33(M), 1936(M), 1938(M), 1940(M). WSP 1389: Drainage area. WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,118.90 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 3, 1934, nonrecording gage at bridge 0.5 mi downstream at same datum. From Dec. 3, 1934, to Oct. 31, 1985, water-stage recorder at site 0.6 mi downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers satellite data-collection platform at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--61 years, 1,030 ft^3/s, 746,200 acre-ft/yr; median of yearly mean discharges, 750 ft^3/s, 543,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 80,800 ft^3/s, Apr. 9, 1969, gage height, 22.99 ft; minimum daily, 4.0 ft^3/s, Jan. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 12	1900	(a)*4,100	*15.36	No other peak greater than base discharge.			

(a) Backwater from ice.
Minimum daily discharge, 106 ft^3/s, Aug. 20.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	325	173	e160	e140	e180	e120	2490	709	417	412	277	146
2	318	174	e160	e140	e180	e120	2390	716	424	340	247	134
3	280	175	e170	e140	e180	e120	2130	694	371	309	229	130
4	255	190	e180	e140	e180	e120	1720	669	335	279	209	151
5	241	194	e200	e140	e170	e120	1390	639	310	256	277	136
6	233	186	e200	e140	e170	e120	1200	599	302	254	186	126
7	226	191	e190	e140	e170	e120	1060	565	290	239	152	291
8	221	194	e190	e140	e170	e120	1010	541	272	235	142	316
9	221	188	e190	e140	e160	e200	962	514	262	212	129	357
10	212	194	e180	e120	e160	e1000	908	492	248	178	129	342
11	203	190	e180	e120	e160	e2000	849	470	234	166	129	266
12	198	204	e180	e120	e160	e4000	804	447	236	311	116	239
13	196	213	e180	e120	e150	e3500	767	424	215	277	121	216
14	196	220	e170	e120	e150	e3000	730	403	198	232	116	200
15	198	241	e170	e130	e150	e2500	693	388	190	336	127	182
16	197	258	e170	e130	e150	e2000	670	369	191	336	116	169
17	198	250	e170	e130	e140	e1400	633	350	192	454	123	164
18	198	238	e160	e130	e140	e1450	609	346	207	891	131	170
19	192	229	e160	e150	e140	e1500	609	345	205	559	129	155
20	191	220	e160	e150	e140	e1500	582	341	205	551	106	147
21	196	196	e155	e150	e130	e1300	563	356	230	478	109	143
22	193	194	e155	e160	e130	1180	541	355	198	386	129	142
23	192	205	e155	e160	e130	1040	532	347	186	347	218	159
24	188	188	e150	e170	e130	1230	579	346	186	325	136	152
25	189	172	e140	e170	e120	2030	534	324	209	341	141	145
26	188	167	e140	e170	e120	2660	527	601	215	342	173	144
27	190	163	e140	e170	e120	2610	523	1130	229	300	301	139
28	182	169	e140	e180	e120	2640	548	854	260	212	416	136
29	175	169	e140	e190	---	2780	634	630	408	411	260	133
30	175	156	e140	e190	---	2680	689	499	456	358	223	129
31	173	---	e140	e200	---	2670	---	442	---	309	179	---
TOTAL	6540	5901	5115	4590	4200	47830	27876	15905	7881	10636	5482	5459
MEAN	211	197	165	148	150	1543	929	513	263	343	177	182
MAX	325	258	200	200	180	4000	2490	1130	456	891	416	357
MIN	173	156	140	120	120	120	523	324	186	166	106	126
AC-FT	12970	11700	10150	9100	8330	94870	55290	31550	15630	21100	10870	10830

CAL YR 1988 TOTAL 221655 MEAN 606 MAX 3010 MIN 98 AC-FT 439700
WTR YR 1989 TOTAL 147415 MEAN 404 MAX 4000 MIN 106 AC-FT 292400

e Estimated

06486000 MISSOURI RIVER AT SIOUX CITY, IA

LOCATION.--Lat. 42°29'09", long 96°24'49", in NW1/4 SE1/4 sec.16 T.29 N., R.9 E., sixth prinicipal meridian, Dakota County, Nebraska, Hydrologic Unit 10230001, on right bank on upstream side of bridge on U.S. Highway 20 and 77 at South Sioux City, Nebraska, 1.9 mi downstream from Big Sioux River, and at mile 732.2.

DRAINAGE.--314,600 mi^2, approximately. The 3,959 mi^2 in Great Divide basin are not included.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1897 to current year in reports of the U.S. Geological Survey. Prior to October 1928 and October 1931 to September 1938, monthly discharges only, published in WSP 1310. January 1879 to December 1890, monthly discharges only, in House Document 238, 73rd Congress, 2d session, Missouri River. Gage height records collected in this vicinity September 1878 to December 1899 are contained in reports of Missouri River Commission and since July 1889 are contained in reports of U.S. Weather Bureau.

REVISED RECORDS.--WSP 716: 1929-30. WSP 876: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,056.98 ft above NGVD. Sept. 2, 1878, to Dec. 31, 1905, nonrecording gages at various locations within 1.7 mi of present site and at various datums. Jan. 1, 1906 to Feb. 14, 1935, nonrecording gage, and Feb. 15, 1935 to Sept. 30, 1969, water-stage recorder at site 227 ft downstream at datum 19.98 ft higher, and Oct. 1, 1969 to Sept. 30, 1970 at datum 20.00 ft higher. Oct. 1, 1970 to Jan. 30, 1981, water-stage recorder at site 227 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Jan. 6, 7, and Feb. 5-28. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--92 years, 31,970 ft^3/s, 23,160,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 441,000 ft^3/s Apr. 14, 1952, gage height, 24.28 ft, datum then in use; minimum, 2,500 ft^3/s Dec. 29, 1941; minimum gage height, 7.83 ft Jan. 9,1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 35,500 ft^3/s, Nov. 3; maximum gage height, 19.20 ft, July 18; minimum daily discharge, 5,060 ft^3/s, Jan. 9; minimum gage height, 7.83 ft, Jan. 9, result of freeze up.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31100	34700	13300	14300	13500	13800	29200	31300	31300	31800	31400	29100
2	31000	34800	13500	12700	10800	13700	29300	31000	31700	31500	31400	29700
3	30700	35200	13700	13300	10300	11200	29700	31300	31400	30100	31700	29700
4	30600	34900	13500	14100	12200	9800	29500	31700	31800	29600	31800	31600
5	31300	35000	13600	14000	15900	12000	29000	31700	31700	30700	32000	30000
6	32200	35100	13700	14800	18100	14300	28600	31600	31500	29100	32000	28500
7	32500	34700	13700	14000	18000	15600	28900	31300	32000	27800	32000	29400
8	32700	34800	13400	8700	18000	14400	29800	31500	32100	30300	32000	29600
9	32800	33000	13100	5060	17800	15200	29500	31600	31900	29800	31800	27600
10	32800	30700	13200	11700	18000	18100	29900	32300	31900	28500	31600	25100
11	32900	29200	12500	15300	18700	16800	30400	32300	32000	30200	31300	24400
12	33300	26700	12400	15300	18800	16000	31300	32700	32700	30600	31400	25300
13	33300	23500	14300	14900	18300	16300	31100	32500	32100	30700	31800	26700
14	33800	20000	13600	14100	18000	16200	30700	32600	31200	31500	31800	27000
15	34100	17200	12600	14000	17900	13800	30600	32400	31600	32900	31600	27100
16	34000	15100	11900	13800	17900	12500	30500	32500	31800	32100	31600	27400
17	33700	13700	11800	14000	17800	11800	30600	33100	31800	32400	32000	27600
18	33500	13700	12700	14100	17600	10500	30900	33500	32400	33300	32400	28000
19	33500	13800	13300	14200	16300	11300	31300	33400	31600	31200	32400	28000
20	33900	13700	12900	14400	14800	11500	31400	32800	31400	30000	32300	28200
21	33800	13700	12400	13700	16200	12200	32100	32600	31500	28600	33200	28300
22	33700	13600	12700	14200	16600	12300	32100	32600	31500	30500	33200	28500
23	33900	13500	12900	14800	14900	12400	32100	32500	31400	29500	32300	28500
24	33800	13000	12300	14400	14700	12900	32000	32200	31400	28600	31800	29000
25	34300	13600	11800	13900	16200	15100	32100	31400	32300	30400	31600	29000
26	34000	13500	11700	13600	15500	18600	32100	31200	31000	30000	31700	29100
27	34100	13600	12600	13700	13700	21900	32000	31100	28900	29200	31200	29400
28	33800	12900	11400	13900	13100	24800	32300	30700	30300	30500	30100	29400
29	33800	13600	11800	13800	---	27800	31900	31400	29300	32300	29700	29400
30	33800	13400	12700	13900	---	29200	31400	30200	29000	32400	28800	29400
31	34300	---	14400	14000	---	29100	---	30500	---	31500	28500	---
TOTAL	1027000	663900	399400	420660	449600	491100	922300	989500	942500	947600	978400	850000
MEAN	33130	22130	12880	13570	16060	15840	30740	31920	31420	30570	31560	28330
MAX	34300	35200	14400	15300	18800	29200	32300	33500	32700	3[illegible]	33200	31600
MIN	30600	12900	11400	5060	10300	9800	28600	30200	28900	27800	28500	24400
AC-FT	2037000	1317000	792200	834400	891800	974100	1829000	1963000	1869000	1880000	1941000	1686000

CAL YR 1988 TOTAL 9912300 MEAN 27080 MAX 38400 MIN 11100 AC-FT 19660000
WTR YR 1989 TOTAL 9081960 MEAN 24880 MAX 35200 MIN 5060 AC-FT 18010000

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples for particle-size distribution were collected from boat cross-section 0.2 mile downstream from gage.

PERIOD OF RECORD.--Water years 1972 to current year. Daily sediment loads October 1954 to September 1971 in reports of U.S. Army Corps of Engineers.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1972 to September 1976, November 1977 to September 1981.
WATER TEMPERATURES: October 1971 to September 1976, November 1977 to September 1981.
SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens June 17, 19, 1981; minimum daily, 410 microsiemens Mar. 22, 1978.
WATER TEMPERATURES: Maximum daily, 28.0°C July 30, 1976 and Aug. 7, 1979; minimum daily, 0.0°C on many days during the winter periods.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,620 mg/L Nov. 20, 1972; minimum daily mean, 42 mg/L Dec. 29, 1975.
SEDIMENT LOADS: Maximum daily, 222,000 tons Nov. 20, 1972; minimum daily, 2,970 tons Dec. 29, 1975.

WATER-QUAILITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988				
04...	0705	30600	16.0	750
07...	0820	32400	12.0	740
11...	0920	32800	14.0	760
14...	1000	33700	12.0	755
18...	0740	33500	12.0	700
21...	1225	33900	12.5	745
25...	0930	34300	10.5	760
28...	1215	33800	6.5	750
NOV				
01...	0650	34900	8.5	770
04...	1300	34000	9.0	755
07...	0900	35100	7.5	770
10...	0730	30500	7.0	730
15...	1110	17500	7.5	740
21...	1145	13700	2.5	750
29...	1225	13300	0.5	760
DEC				
06...	0700	13300	3.0	770
14...	1330	13200	1.0	760
19...	1600	13400	0.0	720
JAN 1989				
18...	0815	14100	0.5	780
24...	1030	14200	0.0	800
FEB				
14...	1430	18000	0.0	740
MAR				
08...	1515	14300	1.0	875
14...	1230	16200	0.5	700
21...	0945	12100	0.5	790
28...	0920	24200	9.0	620
APR				
11...	0745	31300	5.0	690
18...	1705	30900	9.0	750
21...	1230	32100	13.0	750
25...	1200	31900	16.0	750
28...	1300	32300	17.0	750
MAY				
02...	0655	30900	13.5	760
04...	0830	31800	14.0	760
MAY 1989				
09...	0700	31600	14.0	740
12...	0950	33000	14.0	750
15...	1305	32000	17.0	760
18...	0930	33900	17.0	770
22...	1610	32600	19.0	770
25...	0820	31600	18.5	720
30...	1600	29800	18.0	755
JUN				
02...	1330	31800	19.0	740
06...	1130	31500	25.0	745
09...	0700	31800	19.0	730
13...	1130	32100	21.0	720
15...	0815	32000	17.0	750
20...	0730	32400	20.0	790
23...	1130	30500	22.0	760
27...	0900	29000	22.0	740
30...	1100	28300	21.0	740
JUL				
06...	0640	29400	26.5	770
11...	0900	29800	25.0	730
14...	1030	31500	25.0	730
18...	0615	33900	24.0	740
21...	0835	28400	24.0	775
24...	1100	31600	23.0	740
27...	0730	29200	25.0	790
AUG				
01...	0830	31500	26.0	780
04...	0850	31700	27.0	780
08...	0630	32100	22.0	760
11...	1030	31200	27.0	760
15...	1100	31500	27.0	770
18...	0645	32400	23.5	790
22...	0930	33300	23.0	740
25...	1200	31500	26.0	760
29...	0640	30100	23.5	780
SEP				
12...	0905	24600	18.5	800
19...	0905	27700	18.0	780
26...	0715	28900	18.5	750

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
OCT												
07...	WATER TEMPERATURE, 12.0° C (0905-1145), DISCHARGE, 32,400 ft^3/s											
07...	0905	495	20.2	4.70	3.07	100	--	75	89	98	100	--
07...	0910	495	--	10.1	2.74	115	--	75	88	100	--	--
07...	0915	495	--	14.4	2.63	114	--	73	86	100	--	--
07...	0920	495	--	16.8	2.31	106	--	71	85	100	--	--
07...	0922	495	--	18.2	1.98	123	--	61	76	100	--	--
07...	0924	495	--	19.0	2.20	135	--	64	77	100	--	--
07...	0925	495	--	--	--	104	--	75	89	100	--	--
07...	0940	400	15.2	3.70	3.83	109	--	69	88	100	--	--
07...	0942	400	--	8.10	3.39	142	--	59	75	99	100	--
07...	0945	400	--	11.6	3.07	188	--	38	54	99	100	--
07...	0950	400	--	13.5	3.07	212	--	35	50	99	100	--
07...	0955	400	--	14.6	2.63	289	--	25	41	99	100	--
07...	0957	400	--	15.2	2.63	335	--	20	34	98	100	--
07...	1000	400	--	--	--	157	--	44	60	100	--	--
07...	1010	295	14.6	3.40	4.15	--	--	--	--	--	--	--
07...	1013	295	--	7.30	4.04	--	--	--	--	--	--	--
07...	1015	295	--	10.4	3.94	--	--	--	--	--	--	--
07...	1020	295	--	12.2	3.61	--	--	--	--	--	--	--
07...	1025	295	--	13.1	3.39	--	--	--	--	--	--	--
07...	1030	295	--	13.7	3.28	--	--	--	--	--	--	--
07...	1035	295	--	--	--	228	--	30	47	96	100	--
07...	1037	295	--	--	--	233	5	12	--	--	--	--
07...	1045	190	17.2	4.00	4.80	195	--	35	50	98	100	--
07...	1047	190	--	8.60	5.24	278	--	25	41	98	100	--
07...	1050	190	--	12.3	4.37	449	--	14	26	86	100	--
07...	1055	190	--	14.3	3.94	494	--	13	25	86	100	--
07...	1100	190	--	15.5	2.31	1980	--	6	11	62	100	--
07...	1105	190	--	16.2	1.55	1970	--	6	11	59	97	100
07...	1110	190	--	--	--	411	--	18	29	85	100	--
07...	1125	110	--	4.20	4.80	159	--	39	50	91	99	100
07...	1127	110	--	9.10	4.70	198	--	38	51	95	100	--
07...	1130	110	--	13.0	3.94	267	--	26	35	86	100	--
07...	1135	110	--	15.2	3.61	462	--	13	20	67	100	--
07...	1140	110	--	16.4	3.18	456	--	15	22	72	100	--
07...	1143	110	--	17.1	2.53	5900	--	1	2	15	83	99
07...	1145	110	--	--	--	225	--	28	38	84	100	--

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
MAY												
04...	WATER TEMPERATURE, 14.0° C (0835-1110), DISCHARGE, 31,800 ft^3/s											
04...	0835	500	16.2	3.70	3.50	109	--	72	85	97	100	--
04...	0838	500	--	8.10	3.18	115	--	64	76	96	100	--
04...	0841	500	--	11.6	3.07	96	--	67	81	95	100	--
04...	0844	500	--	13.5	2.74	127	--	55	63	91	100	--
04...	0847	500	--	14.6	2.53	150	--	56	64	92	100	--
04...	0850	500	--	15.2	2.42	172	--	40	47	76	100	--
04...	0855	500	--	--	--	114	--	63	74	93	100	--
04...	0905	385	13.4	3.10	4.04	209	--	41	53	93	100	--
04...	0908	385	--	6.70	3.83	232	--	31	46	95	100	--
04...	0911	385	--	9.60	3.72	551	--	13	24	77	100	--
04...	0914	385	--	11.2	3.28	431	--	18	31	93	100	--
04...	0917	385	--	12.1	2.96	600	--	17	26	77	100	--
04...	0920	385	--	12.6	2.53	360	--	20	34	95	100	--
04...	0925	385	--	--	--	272	--	31	43	87	100	--
04...	0940	250	14.4	3.30	5.02	--	--	--	--	--	--	--
04...	0943	250	--	7.20	4.59	--	--	--	--	--	--	--
04...	0946	250	--	10.3	3.83	--	--	--	--	--	--	--
04...	0949	250	--	12.0	3.39	--	--	--	--	--	--	--
04...	0952	250	13.0	13.0	3.28	--	--	--	--	--	--	--
04...	0955	250	--	13.6	3.39	--	--	--	--	--	--	--
04...	1000	250	--	--	--	286	--	30	43	81	100	--
04...	1005	250	--	--	--	462	5	8	--	--	--	--
04...	1010	155	17.4	4.00	4.59	119	--	63	78	97	100	--
04...	1013	155	--	8.70	4.26	192	--	48	61	97	100	--
04...	1016	155	--	12.4	3.83	266	--	30	46	94	100	--
04...	1019	155	--	14.5	3.61	342	--	29	42	87	100	--
04...	1022	155	--	15.7	3.39	385	--	23	36	85	100	--
04...	1025	155	--	16.4	2.85	473	--	20	32	78	100	--
04...	1030	155	--	--	--	215	--	41	55	94	100	--
04...	1045	75.0	20.0	4.60	4.59	129	--	71	83	97	100	--
04...	1049	75.0	--	10.0	4.18	135	--	62	73	96	100	--
04...	1053	75.0	--	14.3	3.72	195	--	44	57	89	100	--
04...	1057	75.0	--	16.7	3.39	262	--	33	43	71	100	--
04...	1101	75.0	--	18.0	1.76	494	--	17	24	56	100	--
04...	1105	75.0	--	18.8	1.11	6700	--	4	5	17	99	100
04...	1110	75.0	--	--	--	183	--	49	57	80	100	--

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

SED. SED SED SED SED. SED

DATE	TIME	LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SUSP FALL DIAM % FINER THAN .004 MM (70338)	SUSP FALL DIAM % FINER THAN .062 MM (70342)	SUSP. FALL DIAM % FINER THAN .125 MM (70343)	SUSP. FALL DIAM % FINER THAN .250 MM (70344)	SUSP. FALL DIAM % FINER THAN .500 MM (70345)	SUSP. FALL DIAM % FINER THAN 1.00 MM (70346)
JUN												
15...	WATER TEMPERATURE, 17.0° C (0850-1125), DISCHARGE, 32,000 ft³/s											
15...	0850	500	17.2	4.00	4.37	131	--	94	91	98	100	--
15...	0853	500	--	8.60	4.26	135	--	82	89	96	100	--
15...	0856	500	--	12.3	3.61	168	--	67	73	93	100	--
15...	0859	500	--	14.3	3.18	381	--	32	38	70	100	--
15...	0902	500	--	15.5	2.31	379	--	28	34	68	100	--
15...	0905	500	--	16.2	1.98	677	--	19	22	54	100	--
15...	0910	500	--	--	--	163	--	71	75	91	100	--
15...	0925	390	15.6	3.62	4.37	235	--	53	66	99	100	--
15...	0928	390	--	7.80	4.26	249	--	44	61	98	100	--
15...	0931	390	--	11.1	3.61	287	--	40	57	96	100	--
15...	0934	390	--	13.0	328	351	--	34	50	98	100	--
15...	0937	390	--	14.0	328	366	--	32	48	96	100	--
15...	0940	390	--	14.7	3.07	466	--	25	40	94	100	--
15...	0945	390	--	--	--	233	--	50	65	97	100	--
15...	0950	300	--	--	--	289	17	30	--	--	--	--
15...	0955	300	14.6	3.40	4.70	--	--	--	--	--	--	--
15...	0959	300	--	7.30	4.15	--	--	--	--	--	--	--
15...	1003	300	--	10.4	3.96	--	--	--	--	--	--	--
15...	1007	300	--	12.2	3.83	--	--	--	--	--	--	--
15...	1011	300	--	13.1	3.72	--	--	--	--	--	--	--
15...	1015	300	--	13.7	3.39	--	--	--	--	--	--	--
15...	1020	300	--	--	--	242	--	46	62	95	100	--
15...	1025	205	16.2	3.70	4.70	182	--	76	87	100	--	--
15...	1028	205	--	8.10	4.15	235	--	57	64	97	100	--
15...	1033	205	--	11.6	3.39	316	--	42	53	88	100	--
15...	1037	205	--	13.5	3.39	453	--	33	43	88	100	--
15...	1041	205	--	16.6	2.85	556	--	22	34	87	100	--
15...	1044	205	--	15.2	3.07	659	--	22	30	81	100	--
15...	1050	205	--	--	--	274	--	42	53	93	100	--
15...	1110	80.0	15.0	3.50	4.37	161	--	74	83	97	100	--
15...	1112	80.0	--	7.50	4.04	180	--	77	78	96	100	--
15...	1114	80.0	--	12.7	3.61	199	--	66	74	96	100	--
15...	1116	80.0	--	12.5	3.18	226	--	57	57	87	100	--
15...	1118	80.0	--	13.5	2.74	269	--	34	45	75	100	--
15...	1120	80.0	--	14.1	2.53	339	--	40	45	75	100	--
15...	1125	80.0	--	--	--	154	--	70	78	95	100	--

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED SUSP FALL DIAM % FINER THAN .004 MM (70338)	SED SUSP FALL DIAM % FINER THAN .062 MM (70342)	SED SUSP FALL DIAM % FINER THAN .125 MM (70343)	SED SUSP FALL DIAM % FINER THAN .250 MM (70344)	SED. SUSP FALL DIAM % FINER THAN .500 MM (70345)	SED SUSP FALL DIAM % FINER THAN 1.00 MM (70346)
JUL												
27	WATER TEMPERATURE, 25.0° C (0720-1000), DISCHARGE, 29,200 ft³/s											
27	0720	500	19.0	4.40	4.30	58	--	92	97	100	--	--
27	0724	500	--	8.50	4.11	77	--	86	95	100	--	--
27	0728	500	--	13.6	3.83	70	--	87	92	100	--	--
27	0732	500	--	15.8	3.96	76	--	81	91	99	100	--
27	0736	500	--	17.1	3.24	86	--	71	79	89	100	--
27...	0738	500	--	17.9	3.18	95	--	57	64	85	100	--
27...	0740	500	--	--	--	68	--	84	92	95	100	--
27	0755	420	19.4	4.50	4.65	96	--	78	93	100	--	--
27	0759	420	--	9.70	4.04	127	--	46	64	100	--	--
27	0803	420	--	13.9	3.44	199	--	42	59	99	100	--
27	0807	420	--	16.2	3.31	239	--	32	51	96	100	--
27	0811	420	--	17.5	2.63	279	--	26	43	98	100	--
27	0813	420	--	18.3	2.20	508	--	17	32	95	100	--
27	0815	420	--	--	--	145	--	38	53	99	100	--
27	0830	350	16.6	3.80	4.48	--	--	--	--	--	--	--
27	0835	350	--	8.30	3.78	--	--	--	--	--	--	--
27...	0840	350	--	11.9	3.83	--	--	--	--	--	--	--
27...	0845	350	--	13.8	3.55	--	--	--	--	--	--	--
27...	0850	350	--	14.9	3.44	--	--	--	--	--	--	--
27...	0853	350	--	--	--	144	--	49	67	100	--	--
27...	0855	350	--	15.6	3.46	--	--	--	--	--	--	--
27...	0900	350	--	--	--	162	12	20	--	--	--	--
27...	0905	260	14.4	3.30	4.26	112	--	64	83	100	--	--
27...	0909	260	--	7.20	3.87	145	--	49	65	96	100	--
27...	0913	260	--	10.3	3.59	188	--	39	54	98	100	--
27...	0917	260	--	12.0	3.18	242	--	32	46	91	100	--
27...	0921	260	--	13.0	2.92	316	--	22	36	81	100	--
27...	0923	260	--	13.6	2.66	445	--	17	29	81	100	--
27...	0925	260	--	--	--	148	--	44	57	95	100	--
27...	0940	150	11.0	2.50	4.26	102	--	61	71	99	100	--
27...	0944	150	--	5.50	4.28	159	--	57	65	98	100	--
27...	0948	150	--	7.90	3.68	168	--	51	60	96	100	--
27...	0952	150	--	9.20	3.28	205	--	29	41	95	100	--
27...	0956	150	--	9.90	3.39	238	--	23	33	85	99	100
27...	1000	150	--	--	--	179	--	40	48	89	100	--

06486000 MISSOURI RIVER AT SIOUX CITY, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED SUSP FALL DIAM % FINER THAN .004 MM (70338)	SED SUSP FALL DIAM % FINER THAN .062 MM (70342)	SED SUSP FALL DIAM % FINER THAN .125 MM (70343)	SED SUSP FALL DIAM % FINER THAN .250 MM (70344)	SED SUSP FALL DIAM % FINER THAN .500 MM (70345)	SED SUSP FALL DIAM % FINER THAN 1.00 MM (70346)
SEP												
07	WATER TEMPERATURE 23.0° C (0810-1050), DISCHARGE, 28,900 ft³/s											
07	0810	500	18.6	4.30	3.83	84	--	91	99	100	--	--
07	0813	500	--	9.30	3.72	78	--	89	94	100	--	--
07	0816	500	--	13.3	3.55	90	--	67	95	100	--	--
07	0819	500	--	15.5	3.33	86	--	85	91	96	100	--
07	0821	500	--	16.7	3.11	84	--	88	97	100	--	--
07	0824	500	--	17.5	2.74	80	--	83	93	99	100	--
07	0827	500	--	--	--	86	--	88	95	99	100	--
07	0845	425	18.0	4.20	4.37	84	--	71	88	100	--	--
07	0848	425	--	9.00	4.04	107	--	57	79	100	--	--
07	0851	425	--	12.9	3.50	138	--	40	59	98	100	--
07	0854	425	--	15.0	3.55	161	--	32	47	99	100	--
07	0857	425	--	16.2	3.07	1810	--	4	26	96	100	--
07	0900	425	--	17.0	3.11	275	--	25	41	97	100	--
07	0905	425	--	--	--	119	--	52	68	98	100	--
07	0918	310	12.0	2.80	4.26	--	--	--	--	--	--	--
07	0924	310	--	6.00	4.26	--	--	--	--	--	--	--
07	0926	310	--	8.60	3.72	--	--	--	--	--	--	--
07	0930	310	--	10.0	3.39	--	--	--	--	--	--	--
07	0935	310	--	10.8	2.85	--	--	--	--	--	--	--
07	0940	310	--	--	--	165	--	39	58	96	100	--
07	0945	310	--	--	--	158	14	24	--	--	--	--
07	0948	195	12.4	2.90	4.37	108	--	60	75	100	--	--
07	0952	195	--	6.20	4.20	131	--	52	64	95	100	--
07	0956	195	--	8.90	3.68	190	--	36	46	93	100	--
07	1000	195	--	11.3	2.76	476	--	16	25	68	100	--
07	1004	195	--	11.2	2.20	689	--	9	16	56	100	--
07	1007	195	--	--	--	107	--	49	62	94	100	--
07	1025	80.0	14.0	3.20	4.48	86	--	69	77	94	100	--
07	1028	80.0	--	7.00	4.48	120	--	50	60	93	100	--
07	1031	80.0	--	10.0	3.83	135	--	36	43	92	100	--
07	1034	80.0	--	11.7	3.07	246	--	28	35	84	100	--
07	1037	80.0	--	12.6	2.63	360	--	18	23	61	99	100
07	1042	80.0	--	13.2	2.03	447	--	12	19	65	100	--
07	1049	80.0	--	--	--	119	--	40	48	86	100	--

SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAM-PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)
OCT.										
07	1041	5	0	1	24	81	97	99	99	100
MAY										
04	1140	5	--	0	26	91	99	100	--	--
JUN										
15	1200	5	--	0	6	87	100	--	--	--
JUL										
27	1005	5	0	1	11	78	97	98	99	100
SEP										
07	1125	5	1	1	17	76	97	99	99	100

06600000 PERRY CREEK AT 38th STREET, SIOUX CITY, IA

LOCATION.--Lat 42°32'08", long 96°24'39", in SE1/4 SE1/4 sec 8, T.89 N., R. 47 W., Woodbury County, Hydrologic Unit 10230001, on left bank at downstream side of bridge on 38th Street in Sioux City, 1.9 mi downstream from West Branch, and 3.6 mi upstream from mouth.

DRAINAGE AREA.--65.1 mi^2.

PERIOD OF RECORD.--October 1945 to September 1969, June 1981 to current year.

REVISED RECORDS.--WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,112.04 ft above NGVD (City of Sioux City benchmark). Prior to May 20, 1954, nonrecording gage with supplementary water-stage recorder in operation above 5.0 ft gage height and May 20, 1954 to Sept. 30, 1969, water-stage recorder at present site at datum 5.0 ft higher.

REMARKS.--Estimated daily discharges: Nov. 28 to Dec. 1, Dec. 7-12, 14-16, 24, 25, 27-30, Jan. 1-4, 7-12, 14-16, 19, 20, 25-28, Feb. 1-25, and Mar. 1-7, 16-18, 21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--32 years (water years 1946-69, 1982-89), 17.2 ft^3/s, 3.59 in/yr, 12,460 acre-ft/yr; median of yearly mean discharges, 14 ft^3/s, 2.9 in/yr, 10,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,780 ft^3/s Sept. 10, 1949, gage height, 26.80 ft, present datum, from rating curve extended above 1,700 ft^3/s on basis of slope-area measurement of peak flow; no flow at times in 1946, 1958-60.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 7, 1944, reached a stage of about 30.5 ft, from floodmarks, present datum, discharge, 9,600 ft^3/s, on basis of contracted-opening measurement of peak flow by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 9	1955	1,660	13.73	July 29	1055	825	11.12
July 18	0130	*3,390	*17.93	Sept. 7	1615	1,390	12.97

Minimum discharge 2.0 ft^3/s July 6, 10-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.1	6.1	3.5	3.2	7.0	5.4	8.0	5.7	4.7	3.2	6.3	3.8
2	3.7	6.1	5.4	3.0	3.3	4.3	7.9	5.7	4.3	3.2	5.4	3.6
3	3.7	6.7	5.8	3.6	2.3	5.0	8.0	5.6	4.4	3.1	5.4	4.3
4	3.9	8.5	5.1	4.2	2.4	3.9	7.7	6.5	3.8	2.7	5.6	11
5	3.8	7.0	6.1	52	2.7	3.1	7.3	6.1	3.7	2.6	6.6	5.3
6	7.4	6.2	6.2	68	3.1	2.7	7.2	5.5	3.7	2.3	5.3	4.9
7	3.9	5.9	5.4	13	3.7	6.6	7.6	5.4	3.6	2.3	4.8	276
8	3.9	5.4	4.0	5.4	2.9	14	7.9	5.9	3.6	2.3	4.6	35
9	3.7	5.7	4.7	6.6	2.8	501	7.1	5.3	3.5	2.4	4.4	14
10	3.5	4.9	3.6	5.4	3.9	281	6.6	5.2	3.6	2.1	4.1	8.4
11	3.3	5.0	2.6	5.6	5.0	87	6.9	5.0	3.9	2.2	4.2	5.8
12	3.6	9.6	4.2	5.6	5.5	38	6.7	4.6	5.3	2.1	4.0	4.5
13	3.3	6.3	5.5	6.0	6.0	22	6.9	4.4	3.8	2.1	5.5	4.3
14	3.5	4.5	4.5	5.9	5.6	33	6.7	4.4	3.5	2.1	11	4.1
15	3.7	5.7	3.0	5.2	5.4	21	6.2	4.5	3.5	5.9	5.0	3.8
16	4.0	6.3	3.7	5.8	5.2	13	6.2	4.5	3.1	3.3	4.6	3.6
17	5.5	5.4	4.5	6.1	4.5	7.6	6.5	4.1	4.1	108	4.0	3.5
18	5.0	6.5	4.5	6.3	4.0	9.0	7.3	4.9	3.7	692	3.8	3.4
19	6.4	6.7	5.7	7.0	3.8	11	6.9	5.4	3.6	20	3.8	3.2
20	6.2	5.4	9.7	7.2	4.7	10	6.6	4.7	2.9	6.7	4.0	3.4
21	6.7	4.7	6.3	8.3	3.7	8.9	6.5	4.2	2.8	5.5	15	3.1
22	6.3	5.6	6.2	8.0	2.8	9.9	6.5	4.2	3.2	4.2	6.2	3.2
23	5.7	5.5	7.0	8.0	2.6	11	5.9	4.1	3.5	3.7	5.0	3.1
24	6.1	5.8	5.1	7.8	5.0	11	6.0	4.2	4.4	3.5	4.6	3.4
25	6.1	6.0	3.5	6.5	13	10	6.6	4.2	6.7	3.3	4.7	3.6
26	6.2	7.2	5.0	5.6	57	11	6.1	4.3	5.5	3.0	10	3.4
27	6.1	6.2	3.5	6.2	18	12	6.7	4.4	8.2	2.8	6.6	3.3
28	5.6	3.4	2.5	6.8	9.3	11	6.5	4.7	4.4	2.7	4.9	3.4
29	5.7	5.2	3.0	8.1	---	9.6	6.7	5.6	3.5	231	4.7	3.4
30	6.3	5.6	3.6	11	---	9.1	5.8	4.5	3.3	29	4.2	3.3
31	6.1	---	4.3	21	---	7.9	---	4.4	---	8.6	4.1	---
TOTAL	153.9	179.1	147.7	322.4	195.2	1190.0	205.5	152.2	121.8	1169.9	172.4	439.1
MEAN	4.96	5.97	4.76	10.4	6.97	38.4	6.85	4.91	4.06	37.7	5.56	14.6
MAX	7.4	9.6	9.7	68	57	501	8.0	6.5	8.2	692	15	276
MIN	3.3	3.4	2.5	3.0	2.3	2.7	5.8	4.1	2.8	2.1	3.8	3.1
AC-FT	305	355	293	639	387	2360	406	302	242	2320	342	871
CFSM	.08	.09	.07	.16	.11	.59	.11	.08	.06	.58	.09	.22
IN.	.09	.10	.08	.18	.11	.68	.12	.09	.07	.67	.10	.25

CAL YR 1988 TOTAL 4585.0 MEAN 12.5 MAX 180 MIN 1.4 AC-FT 9090 CFSM .19 IN. 2.62
WTR YR 1989 TOTAL 4449.2 MEAN 12.2 MAX 692 MIN 2.1 AC-FT 8820 CFSM .19 IN. 2.54

06600100 FLOYD RIVER AT ALTON, IA

LOCATION.--Lat 42°58'55", long 96°00'03", in NE1/4 NE1/4 sec 11, T.94 N., R.44 W., Sioux County, Hydrologic Unit 10230002, on left bank 270 ft downstream from South County Road at east edge of Alton, 34.3 mi upstream from West Branch Floyd River, and at mile 58.1.

DRAINAGE AREA.--268 mi^2.

PERIOD OF RECORD.--October 1955 to current year. Prior to December 1955, monthly discharge only, published in WSP 1730.

REVISED RECORDS.--WDR IA-82-1. Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,269.55 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 28, Dec. 1, 4, 7-17, Dec. 24 to Jan. 13, Jan. 15, 16, 26, Feb. 1 to Mar. 10, and Mar. 15-18, 20-23. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--34 years, 70.8 ft^3/s, 3.59 in/yr, 51,290 acre-ft/yr; median of yearly mean discharges, 56 ft^3/s, 2.8 in/yr, 40,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,300 ft^3/s June 20, 1983, gage height 18.54 ft, from floodmark, from rating curve extended above 8,500 ft^3/s; no flow at times in 1956, 1958-59, 1965, 1968, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1953 reached a discharge of about 45,500 ft^3/s, from information by U. S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar 10	0815	Ice jam	*9.76	Mar. 11	0400	*596	8.75

Minimum discharge, 1.1 ft^3/s Sept. 28-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	17	13	11	15	8.0	25	32	16	7.9	8.0	3.0
2	28	16	16	11	5.0	6.8	24	28	16	6.8	7.3	2.7
3	25	16	15	12	4.2	7.2	24	26	14	6.0	7.0	2.4
4	23	16	14	15	4.7	6.4	24	25	12	16	6.5	2.7
5	22	15	15	20	5.2	5.6	23	26	11	33	6.1	3.2
6	22	13	16	19	6.1	5.0	22	23	11	16	6.1	3.0
7	21	13	15	15	7.0	10	23	21	10	9.8	5.7	8.9
8	20	13	13	11	5.2	45	24	20	10	7.0	4.9	12
9	19	12	12	12	5.5	130	24	19	10	5.7	4.4	9.8
10	18	12	10	11	9.0	350	21	18	9.6	4.7	4.0	6.8
11	16	12	8.4	12	10	472	21	17	9.3	4.5	3.5	5.1
12	16	15	20	13	9.4	185	20	16	9.1	34	3.1	4.3
13	19	16	23	15	8.8	108	20	16	8.9	34	2.8	3.6
14	19	16	19	21	8.4	97	20	16	9.0	15	2.7	3.2
15	17	16	10	16	7.9	88	19	15	8.5	12	2.6	3.1
16	16	11	11	17	7.2	70	19	14	7.8	9.3	2.5	3.1
17	16	12	12	18	6.7	40	19	13	7.3	20	2.3	3.0
18	16	19	13	15	6.1	25	19	14	8.4	125	2.2	2.9
19	15	20	14	13	5.6	85	19	15	8.3	91	2.0	2.7
20	15	13	13	12	7.6	62	19	14	6.8	46	2.0	2.5
21	15	13	14	12	6.2	45	20	12	6.7	28	2.1	2.4
22	15	23	14	13	5.3	33	19	11	6.1	20	3.1	2.2
23	14	22	15	13	4.8	39	20	12	5.7	16	5.4	1.6
24	14	25	14	14	9.0	44	21	32	5.7	13	4.5	1.8
25	13	25	13	15	30	55	23	153	9.3	11	3.3	2.0
26	13	25	14	13	20	50	24	54	11	9.9	3.4	1.6
27	14	19	13	16	15	44	23	33	15	8.7	4.3	1.3
28	13	13	11	17	10	39	29	26	15	7.8	4.7	1.2
29	12	17	13	17	---	33	36	23	11	14	4.1	1.1
30	12	16	14	26	---	29	34	20	9.1	12	3.5	1.5
31	13	---	15	51	---	26	---	19	---	9.5	3.4	---
TOTAL	540	491	432.4	496	244.9	2243.0	678	783	299.6	653.6	127.5	104.7
MEAN	17.4	16.4	13.9	16.0	8.75	72.4	22.6	25.3	9.99	21.1	4.11	3.49
MAX	29	25	23	51	30	472	36	153	18	125	8.0	12
MIN	12	11	8.4	11	4.2	5.0	19	11	5.7	4.5	2.0	1.1
AC-FT	1070	974	858	984	486	4450	1340	1550	594	1300	253	208
CFSM	.06	.06	.05	.06	.03	.27	.08	.09	.04	.08	.02	.01
IN.	.07	.07	.06	.07	.03	.31	.09	.11	.04	.09	.02	.01

CAL YR 1988 TOTAL 20469.9 MEAN 55.9 MAX 557 MIN 3.8 AC-FT 40600 CFSM .21 IN. 2.84
WTR YR 1989 TOTAL 7093.7 MEAN 19.4 MAX 472 MIN 1.1 AC-FT 14070 CFSM .07 IN. .98

06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IA

LOCATION.--Lat 42°55'25", long 96°10'34", in NE1/4 NE1/4 sec. 32, T.94 N., R.45 W., Sioux County, Hydrologic Unit 10230002, on left bank near wingwall at downstream side of bridge on county highway B62, 0.1 mi west of U.S. Highway 75, 0.8 mi downstream from Orange City slough, 2.2 mi northeast of Struble, 21.4 mi upstream from Floyd River, and at mile 45.2 upstream from mouth of Floyd River.

DRAINAGE AREA.--180 mi^2.

PERIOD OF RECORD.--October 1955 to current year. Prior to December 1955, monthly discharge only, published in WSP 1730.

REVISED RECORDS.--WDR IA-82-1: Drainage area, 1978-81 (P).

GAGE.--Water-stage recorder. Datum of gage is 1,239.40 ft above NGVD (State Highway Commission bench mark). Prior to Jan. 5, 1978, at site 721 ft right at old channel at same datum.

REMARKS.--Estimated daily discharges: Nov. 28 to Dec. 4, Dec. 8 to Mar. 9, and Mar. 14-21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--34 years, 45.9 ft^3/s, 3.46 in/yr, 33,250 acre-ft/yr; median of yearly mean discharges, 35 ft^3/yr, 2.6 in/yr, 25,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,060 ft^3/s Mar. 28, 1962, gage height, 15.63 ft; maximum gage height, 15.86 ft June 20, 1983; no flow at times some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 9	2200	ice jam	*9.87	July 18	0015	542	8.02
Mar. 10	0030	*890	9.40				

Minimum discharge, 3.1 ft^3/s Sept. 26

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	24	30	13	10	8.4	19	20	10	7.6	7.6	5.4
2	56	24	33	11	6.0	7.3	19	18	9.6	7.1	7.5	5.2
3	51	25	28	15	5.0	7.8	19	17	9.4	6.8	7.4	5.6
4	48	26	24	25	5.6	7.2	18	16	8.9	7.9	7.3	8.4
5	45	24	29	35	6.3	6.2	18	16	8.6	7.1	8.6	5.0
6	43	24	24	29	7.0	6.5	17	15	9.0	5.9	7.2	4.7
7	41	24	22	15	8.3	13	19	14	8.5	5.8	6.4	12
8	40	23	17	10	7.0	40	21	13	8.1	5.8	6.4	22
9	36	24	15	13	7.8	180	20	12	8.0	5.2	6.2	10
10	36	23	11	12	10	517	19	12	8.1	5.1	5.8	6.5
11	34	23	8.0	14	11	193	19	12	8.0	5.9	5.7	5.2
12	33	26	25	18	12	90	20	11	8.1	6.6	5.6	4.8
13	32	25	32	20	13	54	21	11	8.0	8.9	6.4	5.1
14	31	23	26	25	12	44	21	11	8.0	6.4	6.4	4.8
15	31	23	9.2	23	12	37	22	11	8.0	7.2	5.6	4.9
16	30	21	15	21	11	30	21	11	7.9	6.2	5.7	4.8
17	30	24	17	20	10	20	20	11	8.0	30	6.3	4.8
18	30	24	26	26	7.0	30	23	11	9.5	194	5.2	4.9
19	29	24	24	28	7.5	47	23	11	8.2	47	5.2	4.5
20	30	23	22	22	8.4	23	22	11	7.6	18	5.4	4.5
21	29	25	20	24	7.2	26	21	10	7.8	13	6.2	4.5
22	28	25	24	31	5.9	28	20	10	7.6	11	7.7	3.9
23	27	26	21	27	5.6	28	22	12	7.8	9.6	7.1	3.7
24	27	30	18	28	9.0	28	21	15	8.5	9.6	5.9	3.9
25	28	30	15	23	20	28	20	10	11	9.0	4.8	3.8
26	28	30	17	15	18	25	19	9.5	11	9.2	7.9	4.1
27	27	23	14	18	16	26	19	9.1	10	8.5	8.5	4.7
28	25	16	12	23	10	23	24	9.5	8.7	7.8	6.7	4.5
29	24	35	10	22	---	22	22	9.8	8.5	19	6.1	3.7
30	24	28	15	21	---	21	21	9.3	7.9	13	5.8	4.6
31	24	---	20	19	---	20	---	10	---	8.4	5.9	---
TOTAL	1061	745	623.2	646	268.6	1636.4	610	378.2	258.3	512.6	200.5	174.5
MEAN	34.2	24.8	20.1	20.8	9.59	52.8	20.3	12.2	8.61	16.5	6.47	5.82
MAX	64	35	33	35	20	517	24	20	11	194	8.6	22
MIN	24	16	8.0	10	5.0	6.2	17	9.1	7.6	5.1	4.8	3.7
AC-FT	2100	1480	1240	1280	533	3250	1210	750	512	1020	398	346
CFSM	.19	.14	.11	.12	.05	.29	.11	.07	.05	.09	.04	.03
IN.	.22	.15	.13	.13	.06	.34	.13	.08	.05	.11	.04	.04

CAL YR 1988 TOTAL 13856.3 MEAN 37.9 MAX 1590 MIN 1.3 AC-FT 27480 CFSM .21 IN. 2.86
WTR YR 1989 TOTAL 7114.3 MEAN 19.5 MAX 517 MIN 3.7 AC-FT 14110 CFSM .11 IN. 1.47

06600500 FLOYD RIVER AT JAMES, IA

LOCATION.--Lat 42°34'36", long 96°18'43", in SE1/4 SE1/4 sec.30, T.90 N., R.46 W., Plymouth County, Hydrologic Unit 10230002, on right bank at downstream side of bridge on county highway C70, 0.2 mi east of James, 14.3 mi downstream from West Branch Floyd River, and at mile 7.5.

DRAINAGE AREA.--886 mi^2.

PERIOD OF RECORD.--December 1934 to current year.

REVISED RECORDS.--WSP 1240: 1935 (M), 1936, 1937-38 (M), 1942, 1945. WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,092.59 ft above NGVD. Prior to Sept. 11, 1938, June 9 to Nov. 5, 1953, and Oct. 1, 1955, to May 22, 1957, nonrecording gage and May 23, 1957, to Sept. 30, 1970, water-stage recorder at same site at datum 10.0 ft higher.

REMARKS.--Estimated daily discharges: Nov. 28 to Mar. 11, Mar. 18 and July 18, 19. Records good except for estimated daily discharges which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--54 years (water years 1936-89), 221 ft^3/s, 3.39 in/yr, 160,100 acre-ft/yr; median of yearly mean discharges, 160 ft^3/s, 2.4 in/yr, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 71,500 ft^3/s June 8, 1953, gage height, 25.3 ft, from floodmarks, datum then in use, from rating curve extended above 16,000 ft^3/s on basis of contracted-opening and flow-over-embankment measurement of peak flow; minimum daily discharge, 0.90 ft^3/s Jan. 10-22, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage and discharge since 1892, that of June 8, 1953, from information by U. S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
July 18	unknown	*3,500	*16.07	No other peak greater than base discharge.			

Minimum discharge, 24 ft^3/s Sept. 30

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	171	81	70	54	84	55	104	95	67	50	75	33
2	152	81	94	48	55	50	99	92	65	46	65	32
3	146	88	100	53	27	50	97	90	61	43	60	32
4	134	91	80	60	30	45	95	88	56	42	57	38
5	127	90	85	79	31	40	93	84	53	41	88	36
6	121	84	102	100	31	35	91	80	51	44	106	36
7	119	82	85	70	33	36	90	79	49	54	57	131
8	117	80	66	55	30	42	91	77	47	46	52	278
9	117	79	58	61	29	80	90	73	47	41	49	92
10	112	77	45	58	35	700	89	73	46	38	45	67
11	106	78	40	58	41	1100	88	70	46	38	43	53
12	103	93	72	60	42	874	86	68	48	41	42	46
13	100	95	90	61	41	399	87	67	47	42	43	41
14	100	90	80	66	40	310	85	66	45	56	46	39
15	101	90	47	63	38	203	84	65	45	70	45	38
16	98	87	57	59	37	203	83	65	44	58	44	37
17	99	63	70	58	35	154	82	63	44	152	43	35
18	100	93	82	61	34	125	83	63	47	2060	41	35
19	96	98	78	66	33	148	84	67	47	590	37	34
20	94	91	72	68	35	167	83	66	44	304	36	30
21	96	81	68	75	32	123	83	63	42	180	39	28
22	94	93	78	88	31	146	83	60	47	126	36	28
23	92	106	70	76	30	146	80	60	44	100	36	27
24	87	108	66	74	50	148	81	62	44	86	36	27
25	87	113	64	70	76	142	84	95	54	79	35	26
26	85	119	66	65	90	147	82	132	59	72	38	25
27	86	115	63	74	74	143	82	113	61	67	41	25
28	83	62	62	83	61	135	94	88	58	63	38	25
29	82	80	62	100	---	127	97	82	53	276	37	25
30	79	86	64	150	---	118	95	74	50	257	35	25
31	80	---	70	140	---	108	---	69	---	101	34	---
TOTAL	3264	2674	2206	2253	1205	6299	2645	2389	1511	5263	1479	1424
MEAN	105	89.1	71.2	72.7	43.0	203	88.2	77.1	50.4	170	47.7	47.5
MAX	171	119	102	150	90	1100	104	132	67	2060	106	278
MIN	79	62	40	48	27	35	80	60	42	38	34	25
AC-FT	6470	5300	4380	4470	2390	12490	5250	4740	3000	10440	2930	2820
CFSM	.12	.10	.08	.08	.05	.23	.10	.09	.06	.19	.05	.05
IN.	.14	.11	.09	.09	.05	.26	.11	.10	.06	.22	.06	.06

CAL YR 1988 TOTAL 62102 MEAN 170 MAX 1670 MIN 33 AC-FT 123200 CFSM .19 IN. 2.61
WTR YR 1989 TOTAL 32612 MEAN 89.3 MAX 2060 MIN 25 AC-FT 64690 CFSM .10 IN. 1.37

06601200 MISSOURI RIVER AT DECATUR, NE

LOCATION.--Lat 42°00'26", long 96°14'29", in NE1/4 SW1/4 sec.36, T.24 N., R.10 E., Burt County, Hydrologic Unit 10230001, on right bank 0.1 mi upstream from Iowa Highway 175 bridge at Decatur, and at mile 691.0.

DRAINAGE AREA.--316,200 mi^2, approximately. The 3,959 mi^2 in Great Divide basin are not included.

PERIOD OF RECORD.--October 1987 to September 1989.

GAGE.--Water-stage encoder. Datum of gage is 1,010.00 ft above NGVD, supplementary adjustment of 1954.

REMARKS.--Estimated daily discharges: Feb. 4-27. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,600 ft^3/s Sept. 16, 1988, gage height, 25.59 ft; minimum daily discharge, 8,290 ft^3/s Jan. 9, 1989; minimum gage height, 13.78, Jan. 9, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 38,300 ft^3/s July 18, gage height, 24.55 ft; minimum daily discharge, 8,290 ft^3/s Jan. 9; minimum gage height, 13.78, Jan. 9, 1989.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32300	34600	13600	14700	14100	13700	29600	32000	32000	31200	32000	30000
2	32100	34800	13700	14100	12600	14400	29500	31900	32400	32500	31900	30400
3	32000	35100	13700	13100	10900	13700	29500	31800	32100	32100	32000	30700
4	31900	35000	13700	14200	13000	11600	29700	32100	31800	30400	31900	32600
5	32200	35200	13600	14200	16900	11300	29300	32400	32500	30400	32000	31600
6	32900	35300	13600	14900	18800	13300	28900	32200	31800	31000	32100	29600
7	33100	34900	13700	14500	18900	15100	28800	31800	31900	28500	32000	28700
8	33100	34600	13500	13100	18800	15800	29700	31500	32800	29100	32000	30600
9	33400	34000	13300	8290	18500	15700	29900	31800	32700	31400	32000	28900
10	33400	31100	13200	9010	18700	19800	30000	32400	32400	29500	31800	26800
11	33500	29700	13000	14000	19400	19100	30100	32700	32300	29800	31900	25200
12	34000	28000	12400	15600	19500	17400	31100	32900	32900	31700	32000	25300
13	34000	25400	13300	15700	19000	17300	31600	33200	33000	31300	32200	26700
14	34200	22500	14500	14900	18800	17300	31400	33400	31600	31800	32600	27400
15	34700	19900	13500	14600	18600	16400	31000	33400	31200	33300	32400	27400
16	34800	17700	12700	14700	18500	14200	31100	33300	32000	34300	32100	27800
17	34800	15800	12400	14800	18400	13100	31000	33300	31700	33000	31800	27900
18	34600	15000	13000	15000	18200	12300	31100	33500	32200	36400	32000	28100
19	34500	14900	13800	15000	17000	11700	31500	33600	32300	35100	31900	28300
20	34600	14700	14300	15000	15200	12200	31600	33400	31500	33600	32100	28700
21	34900	14500	13700	14400	15900	12500	31900	33100	31600	31500	32300	28800
22	34600	14400	13500	13800	16700	12900	32300	33000	32100	30900	33500	29000
23	34500	14300	13800	14200	15200	13100	32400	33100	31900	31400	32400	29100
24	34500	13900	13700	14500	15000	13300	32700	33000	31800	29300	32100	29500
25	34500	13900	13100	14600	15900	14300	32900	32300	32500	29500	32100	29600
26	34500	14100	12700	14300	15600	16900	32900	31800	32700	31100	32500	29700
27	34400	14100	12900	14100	14800	20300	32400	32200	30400	29800	32700	29900
28	34400	13900	13200	14100	14000	23500	32500	32000	29600	30000	31500	30100
29	34200	13600	11900	14200	---	26700	32200	34100	31200	32300	31200	30200
30	34000	13800	12600	14200	---	29400	32100	32700	28700	33500	30500	30200
31	34200	---	13900	14400	---	29700	---	31500	---	32400	29900	---
TOTAL	1048800	688700	413500	436200	466900	508000	930700	1011400	955600	978100	991400	868800
MEAN	33830	22960	13340	14070	16670	16390	31020	32630	31850	31550	31980	28960
MAX	34900	35300	14500	15700	19500	29700	32900	34100	33000	36400	33500	32600
MIN	31900	13600	11900	8290	10900	11300	28800	31500	28700	28500	29900	25200
AC-FT	2080000	1366000	820200	865200	926100	1008000	1846000	2006000	1895000	1940000	1966000	1723000

CAL YR 1988 TOTAL 10152000 MEAN 27740 MAX 40100 MIN 11900 AC-FT 20140000
WTR YR 1989 TOTAL 9298100 MEAN 25470 MAX 36400 MIN 8290 AC-FT 18440000

06602020 WEST FORK DITCH AT HORNICK, IA

LOCATION.--Lat 42°13'37", long 96°04'40", in SW1/4 sec.27, T.86 N., R.45 W., Woodbury County, Hydrologic Unit 10230004, on left bank at upstream side of State Highway 141 bridge, 1.0 mi east of Hornick, 9.2 mi upstream from Wolf Creek, and 13.5 mi north of Onawa.

DRAINAGE AREA.--403 mi^2.

PERIOD OF RECORD.--April 1939 to September 1969 (published as "at Holly Springs"), July 1974 to current year.

REVISED RECORDS.--WSP 1240: 1943, 1945 (M). WSP 1310: 1941 (M) 1944-46 (M). WSP 1440: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,045.82 ft above NGVD. Prior to June 16, 1959, nonrecording gage at site 3.0 mi upstream and June 16, 1959 to Sept. 30, 1969, recording gage at site 2.2 mi upstream at datum 7.0 ft higher.

REMARKS.--Estimated daily discharges: Nov. 28 to Dec. 6, Dec. 9 to Mar. 10, and Mar. 17-19. Records good except those for estimated daily discharges, which are poor. West Fork ditch is a dredged channel which diverts flow of West Fork Little Sioux River at Holly Springs 5.5 mi south, then southeast 6.5 mi to a point 1.2 mi west of Kennebec, where Wolf Creek enters from left. From this point, ditch roughly parallels the Little Sioux River and is known as Monona-Harrison ditch. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--45 years (water years 1940-69, 1975-89), 109 ft^3/s, 3.67 in/yr, 78,970 acre-ft/yr; median of yearly mean discharges, 89 ft^3/s, 3.0 in/yr, 64,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,400 ft^3/s Mar. 28, 1962, gage height, 22.46 ft, site and datum then in use; maximum gage height, 25.2 ft Mar. 30, 1960, from floodmark, site and datum then in use; minimum daily discharge, 0.2 ft^3/s July 30, Aug. 17, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	0400	*2,600	(a) *17.67	No other peak greater than base discharge.			

(a) Ice jam.

Minimum daily discharge, 19 ft^3/s, Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	46	45	39	150	50	62	53	41	33	42	20
2	69	47	43	35	100	47	59	50	40	32	33	19
3	63	47	50	37	25	49	59	49	37	31	30	20
4	59	48	47	40	28	42	57	47	35	30	28	191
5	57	48	49	66	30	37	57	46	35	30	28	139
6	56	47	50	150	32	35	56	45	34	29	27	39
7	55	47	53	40	42	37	56	44	33	28	27	43
8	54	46	48	32	37	60	57	43	32	39	26	363
9	53	46	39	37	36	250	56	41	32	30	25	134
10	52	45	34	35	42	1300	55	40	32	26	25	54
11	51	45	30	34	46	947	54	39	33	26	24	40
12	50	50	44	36	52	355	53	38	36	25	23	34
13	50	52	56	38	50	174	54	37	32	25	24	31
14	49	50	48	42	45	129	52	36	32	26	25	30
15	49	49	33	40	43	174	52	35	32	30	29	29
16	49	52	36	38	40	121	51	35	32	30	24	27
17	49	48	43	38	37	90	49	35	32	29	23	27
18	49	51	52	40	34	82	49	34	33	691	23	26
19	49	54	48	43	32	88	51	35	33	192	23	25
20	49	55	45	46	37	95	50	35	33	61	23	24
21	49	50	42	50	34	76	48	34	31	42	24	23
22	48	53	45	60	31	80	48	32	32	36	24	23
23	47	61	43	54	30	78	48	32	34	33	22	22
24	46	56	40	52	32	76	46	32	35	31	21	22
25	46	56	39	47	60	72	45	36	38	30	21	22
26	46	56	40	43	120	71	45	52	39	28	26	22
27	46	56	38	45	90	67	45	40	40	28	25	22
28	45	41	37	46	60	66	46	39	40	27	25	21
29	46	45	36	50	---	67	56	113	38	51	24	21
30	46	47	39	52	---	65	57	43	34	84	22	21
31	46	---	43	66	---	63	---	41	---	65	21	---
TOTAL	1591	1494	1335	1471	1395	4943	1573	1311	1040	1898	787	1534
MEAN	51.3	49.8	43.1	47.5	49.8	159	52.4	42.3	34.7	61.2	25.4	51.1
MAX	69	61	56	150	150	1300	62	113	41	691	42	363
MIN	45	41	30	32	25	35	45	32	31	25	21	19
AC-FT	3160	2960	2650	2920	2770	9800	3120	2600	2060	3760	1560	3040
CFSM	.13	.12	.11	.12	.12	.40	.13	.10	.09	.15	.06	.13
IN.	.15	.14	.12	.14	.13	.46	.15	.12	.10	.18	.07	.14

CAL YR 1988 TOTAL 23241 MEAN 63.5 MAX 687 MIN 25 AC-FT 46100 CFSM .16 IN. 2.15
WTR YR 1989 TOTAL 20372 MEAN 55.8 MAX 1300 MIN 19 AC-FT 40410 CFSM .14 IN. 1.88

06602400 MONONA-HARRISON DITCH NEAR TURIN, IA

LOCATION.--Lat 41°57'52", long 95°59'30", in NW1/4 NE1/4 sec.32, T.83 N., R.44 W., Monona County, Hydrologic Unit 10230004, on left pier at downstream side of bridge on county highway E54, 1.0 mi west of gaging station on Little Sioux River near Turin, 4 mi southwest of Turin, 5.2 mi northeast of Blencoe, and 12.5 mi upstream from mouth.

DRAINAGE AREA.--900 mi^2.

PERIOD OF RECORD.--April 1939 to current year. Records for April 1939 to January 1958 not equivalent owing to diversion from Little Sioux River through equalizer ditch 1.5 mi upstream. Prior to May 1942, published as "near Blencoe".

GAGE.--Water-stage encoder. Datum of gage is 1,015.00 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to May 7, 1942, nonrecording gage at site 4.8 mi downstream at datum 5.40 ft lower. May 7, 1942 to Oct. 13, 1953, nonrecording gage and Oct. 14, 1953 to Sept. 30, 1975, recording gage at same site at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 28 to Dec. 1, Dec. 8-17, Dec. 20 to Jan. 13, Feb. 1-19, Feb 28 to Mar. 9, Mar 16-18. Records good except those for estimated daily discharges, which are poor. Monona-Harrison ditch is a dug channel and is a continuation of West Fork ditch, paralleling the Little Sioux River, and discharging into the Missouri River 1.5 mi upstream from the mouth of the Little Sioux River. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--31 years (water years 1959-89), 246 ft^3/s, 3.71 in/yr, 178,200 acre-ft/yr; median of yearly mean discharges, 200 ft^3/s, 3.0 in/yr, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,900 ft^3/s Feb. 19, 1971, gage height, 28.03 ft, present datum; minimum daily discharge, 8.5 ft^3/s Jan. 3-11, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	0915	*5,280	*17.81	No other peak greater thaqm base discharge.			

Minimum discharge, 14 ft^3/s Jan. 20, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	120	70	76	62	110	88	100	81	102	65	89	39
2	119	72	90	53	70	76	96	77	86	63	61	38
3	106	73	91	56	46	74	97	75	89	62	52	38
4	96	75	84	62	50	64	92	75	75	60	52	126
5	91	77	85	70	53	55	89	72	69	58	49	919
6	89	74	89	400	58	50	88	70	67	58	46	133
7	87	74	88	170	70	52	88	70	67	58	44	92
8	88	75	70	69	64	59	90	70	71	58	43	834
9	87	73	62	84	60	250	96	66	62	65	41	982
10	87	74	57	72	72	3790	88	64	63	56	40	249
11	83	74	53	78	93	2350	86	63	65	48	39	129
12	81	81	68	87	98	836	85	62	77	48	37	91
13	82	92	75	110	93	349	86	61	74	45	37	76
14	82	94	70	98	87	204	87	61	65	43	42	69
15	79	89	58	81	81	214	84	60	65	46	49	64
16	77	86	62	77	76	180	86	58	66	51	50	61
17	76	89	72	75	74	110	83	58	66	52	40	59
18	75	88	77	75	72	85	82	60	69	542	38	56
19	75	94	75	76	71	110	80	63	68	1430	38	54
20	75	93	72	75	71	126	80	62	67	276	39	51
21	76	84	71	83	70	111	77	60	66	96	41	51
22	75	87	84	88	68	107	76	58	67	65	50	47
23	76	101	79	90	64	115	76	58	65	55	57	43
24	71	99	72	90	68	113	75	57	67	51	42	43
25	70	98	68	89	70	107	73	54	77	49	38	45
26	68	99	73	79	81	107	73	71	78	48	40	46
27	70	97	70	82	152	109	71	67	78	46	59	47
28	69	65	66	94	100	108	72	64	80	44	60	47
29	69	68	65	86	---	107	77	928	75	96	48	48
30	69	82	67	88	---	107	89	567	69	413	43	47
31	68	---	74	134	---	103	---	158	---	208	41	---
TOTAL	2537	2497	2263	2933	2142	10316	2522	3470	2155	4355	1445	4624
MEAN	81.8	83.2	73.0	94.6	75.5	333	84.1	112	71.8	140	46.6	154
MAX	120	101	91	400	152	3790	100	928	102	1430	89	982
MIN	68	65	53	53	46	50	71	54	62	43	37	38
AC-FT	5030	4950	4490	5820	4250	20460	5000	6880	4270	8640	2870	9170
CFSM	.09	.09	.08	.11	.08	.37	.09	.12	.08	.16	.05	.17
IN.	.10	.10	.09	.12	.09	.43	.10	.14	.09	.18	.06	.19

CAL YR 1988 TOTAL 42549 MEAN 116 MAX 621 MIN 43 AC-FT 84400 CFSM .13 IN. 1.76
WTR YR 1989 TOTAL 41259 MEAN 113 MAX 3790 MIN 37 AC-FT 81840 CFSM .13 IN. 1.71

06604200 WEST OKOBOJI LAKE AT LAKESIDE LABORATORY NEAR MILFORD, IA

LOCATION.--Lat 43°22'43", long 95°10'52", in NE1/4 SW1/4 sec.23, T.99N., R.37W., Dickinson County, Hydrologic Unit 10230003, at pumping station of Lakeside Laboratory on west shore, 2.3 mi upstream from lake outlet and 3.8 mi northwest of Milford.

DRAINAGE AREA.--125 mi^2.

PERIOD OF RECORD.--May 1933 to current year. Published as "Okoboji Lake at Arnold's Park" 1933-37 and as "Okoboji Lake at Lakeside Laboratory near Milford" 1937-66.

GAGE.--Water-stage recorder. Datum of gage is 1,391.76 ft above NGVD, 94.51 ft above Iowa Lake Survey datum, and about 4.0 ft below crest of spillway. Prior to June 17, 1938, nonrecording gage at State Pier at Arnolds Park at same datum.

REMARKS.--Lake formed by concrete dam with ungated spillway at elevation 1,395.8 ft above NGVD. Lake is used for conservation and recreation. Area of lake is approximately 3,900 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height 6.28 ft June 22, 1984; minimum observed, 0.20 ft Sept. 20, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.26 ft May 25; minimum, 2.42 ft Sept. 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.23	2.79	2.87	2.82	2.82	2.80	2.85	3.21	3.19	2.99	2.96	2.76
2	3.22	2.79	2.87	2.82	2.81	2.80	2.86	3.21	3.17	2.98	2.95	2.75
3	3.22	2.78	2.87	2.81	2.81	2.80	2.86	3.20	3.17	2.97	2.94	2.73
4	3.20	2.80	2.86	2.81	2.81	2.80	2.86	3.21	3.16	2.96	2.92	2.81
5	3.16	2.83	2.86	2.81	2.81	2.80	2.87	3.21	3.14	2.95	2.90	2.80
6	3.13	2.82	2.86	2.81	2.81	2.80	2.96	3.18	3.12	2.94	2.89	2.78
7	3.11	2.80	2.86	2.82	2.82	2.80	3.08	3.17	3.12	2.92	2.88	2.79
8	3.11	2.79	2.85	2.82	2.81	2.80	3.11	3.17	3.14	2.89	2.85	2.80
9	3.10	2.79	2.85	2.82	2.81	2.81	3.09	3.17	3.12	2.86	2.80	2.79
10	3.09	2.78	2.85	2.81	2.81	2.82	3.08	3.16	3.10	2.85	2.78	2.77
11	3.07	2.77	2.84	2.81	2.81	2.82	3.08	3.14	3.09	3.03	2.76	2.75
12	3.05	2.80	2.85	2.81	2.81	2.82	3.07	3.14	3.08	3.06	2.73	2.73
13	3.03	2.80	2.84	2.81	2.81	2.82	3.06	3.13	3.06	3.07	2.70	2.71
14	3.02	2.81	2.84	2.81	2.81	2.82	3.06	3.12	3.05	3.06	2.68	2.70
15	3.02	2.82	2.84	2.81	2.81	2.82	3.06	3.11	3.03	3.07	2.67	2.68
16	3.02	2.84	2.84	2.81	2.81	2.82	3.06	3.11	3.02	3.08	2.84	2.66
17	3.01	2.85	2.83	2.81	2.81	2.82	3.06	3.09	3.01	3.10	2.84	2.65
18	2.99	2.85	2.83	2.80	2.81	2.83	3.04	3.11	3.03	3.11	2.83	2.64
19	2.98	2.04	2.83	2.80	2.81	2.83	3.04	3.11	3.02	3.13	2.82	2.62
20	2.97	2.84	2.83	2.80	2.81	2.83	3.03	3.10	2.99	3.11	2.79	2.62
21	2.96	2.83	2.83	2.80	2.81	2.83	3.03	3.08	2.98	3.10	2.77	2.62
22	2.95	2.82	2.83	2.80	2.81	2.83	3.04	3.07	3.01	3.04	2.77	2.62
23	2.93	2.82	2.83	2.80	2.81	2.83	3.04	3.09	3.00	3.03	2.76	2.61
24	2.91	2.82	2.82	2.79	2.80	2.83	3.07	3.24	2.99	3.01	2.75	2.57
25	2.89	2.83	2.82	2.80	2.80	2.84	3.13	3.25	3.01	3.00	2.78	2.52
26	2.88	2.86	2.83	2.81	2.80	2.84	3.17	3.23	3.04	2.99	2.77	2.49
27	2.85	2.84	2.82	2.81	2.80	2.84	3.20	3.22	3.05	2.98	2.76	2.47
28	2.84	2.85	2.82	2.81	2.80	2.85	3.23	3.21	3.03	2.96	2.77	2.44
29	2.83	2.87	2.82	2.82	---	2.85	3.23	3.21	3.02	2.95	2.79	2.44
30	2.81	2.87	2.82	2.82	---	2.85	3.22	3.21	3.00	2.94	2.80	2.43
31	2.80	---	2.82	2.82	---	2.85	---	3.20	---	2.94	2.79	---
MEAN	3.01	2.82	2.84	2.81	2.81	2.82	3.05	3.16	3.06	3.00	2.81	2.66
MAX	3.23	2.87	2.87	2.82	2.82	2.85	3.23	3.25	3.19	3.13	2.96	2.81
MIN	2.80	2.77	2.82	2.79	2.80	2.80	2.85	3.07	2.98	2.85	2.67	2.43

CAL YR 1988 MEAN 3.75 MAX 4.54 MIN 2.77
WTR YR 1989 MEAN 2.91 MAX 3.25 MIN 2.43

06505000 OCHEYEDAN RIVER NEAR SPENCER, IA

LOCATION.--Lat 43°07'44", long 95°12'37", in SW1/4SW1/4 sec.15, T.96N., R.37W., Clay County, Hydrologic Unit 10230003, on left bank 3 ft upstream from bridge on county highway M38, 3.4 mi west by southwest of Spencer, and at mile 4.1.

DRAINAGE AREA.--426 mi^2.

PERIOD OF RECORD.--October 1977 to current year. Occasional low-flow measurements, water years 1957-61, 1964, 1966-68, 1970, 1971, 1974-77.

GAGE.--Water-stage recorder. Datum of gage is 1,311.66 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 28 to Mar. 25. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--12 years, 233 ft^3/s, 7.43 in/yr, 168,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,450 ft^3/s June 21, 1983, gage height, 10.49 ft; no flow Jan. 24 to Mar. 9, 1979.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 8, 1953 reached a stage of 12.89 ft, discharge, 26,000 ft^3/s on basis of contracted-opening measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 24	0615	*903	*6.15				

Minimum discharge, 8.3 ft^3/s Mar. 1

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	16	22	19	11	8.5	71	84	53	25	20	20
2	22	15	35	18	10	9.0	59	77	52	24	21	19
3	20	16	36	19	9.8	9.6	53	71	51	22	21	25
4	19	19	34	20	10	11	53	68	46	27	19	34
5	18	22	32	21	9.8	14	50	64	43	42	18	27
6	18	15	32	19	9.6	17	49	59	40	31	17	25
7	18	19	33	18	9.8	19	49	52	39	26	17	39
8	18	16	29	18	10	22	52	50	39	24	16	32
9	18	15	27	17	9.6	24	50	48	38	23	15	26
10	18	15	26	16	9.8	33	47	44	34	23	15	23
11	16	15	26	16	10	160	49	41	33	29	16	20
12	15	22	27	15	9.4	220	46	39	32	89	17	20
13	16	21	28	15	8.6	120	49	38	31	96	17	18
14	16	18	30	15	9.1	86	47	35	31	54	17	16
15	17	19	29	14	9.0	70	44	34	31	43	14	16
16	18	21	27	14	9.8	60	46	31	28	34	13	16
17	18	22	28	14	9.2	56	46	29	26	32	11	14
18	17	24	29	13	9.4	52	44	31	30	43	12	13
19	16	24	28	13	9.8	47	44	30	25	46	12	13
20	17	21	27	13	10	49	45	25	23	35	13	13
21	17	29	27	12	10	51	47	22	23	31	12	13
22	16	34	28	13	9.8	51	47	22	28	28	13	13
23	16	30	26	13	9.6	54	48	36	26	26	13	12
24	15	25	27	12	10	70	140	594	24	24	11	12
25	16	27	25	12	11	125	134	346	27	23	11	10
26	15	28	22	12	9.8	97	86	160	35	22	16	10
27	16	26	24	12	9.0	96	75	106	39	21	15	10
28	16	22	23	12	8.8	92	110	86	33	21	15	10
29	16	23	22	11	---	94	107	76	29	24	14	9.4
30	14	24	20	12	---	86	94	66	26	24	13	9.7
31	17	---	21	13	---	77	---	56	---	22	19	---
TOTAL	534	643	850	461	271.7	1980.1	1881	2520	1015	1034	473	538.1
MEAN	17.2	21.4	27.4	14.9	9.70	63.9	62.7	81.3	33.8	33.4	15.3	17.9
MAX	25	34	36	21	11	220	140	594	53	96	21	39
MIN	14	15	20	11	8.6	8.5	44	22	23	21	11	9.4
AC-FT	1060	1280	1690	914	539	3930	3730	5000	2010	2050	938	1070
CFSM	.04	.05	.06	.03	.02	.15	.15	.19	.08	.08	.04	.04
IN.	.05	.06	.07	.04	.02	.17	.16	.22	.09	.09	.04	.05

CAL YR 1988 TOTAL 37707.3 MEAN 103 MAX 662 MIN 8.7 AC-FT 74790 CFSM .24 IN. 3.29
WTR YR 1989 TOTAL 12200.9 MEAN 33.4 MAX 594 MIN 8.5 AC-FT 24200 CFSM .08 IN. 1.07

06605850 LITTLE SIOUX RIVER AT LINN GROVE, IA

LOCATION.--Lat 42°53'24", long 95°14'30", in SW1/4 SW1/4 sec.5, T.93 N., R.37 W., Buena Vista County, Hydrologic Unit 10230003, on right bank at downstream side of bridge on State Highway 264, in Linn Grove, and at mile 123.7.

DRAINAGE AREA.--1,548 mi^2.

PERIOD OF RECORD.--October 1972 to current year.

REVISED RECORDS.--WDR IA-80-1: 1978-79.

GAGE.--Water-stage recorder. Datum of gage is 1,223.60 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 30, 31, Nov. 20, 26, 27, Dec. 25-29, Jan. 8-11, and Feb. 1 to Mar. 24. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--17 years, 692 ft^3/s, 6.07 in/yr, 501,400 acre-ft/yr; median of yearly mean discharges, 680 ft^3/s, 6.0 in/yr, 493,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft^3/s June 17, 1984, gage height, 19.58 ft; maximum gage height, 19.58 ft June 17, 1984; minimum daily discharge, 0.70 ft^3/s Feb. 4, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 13	0030	*920	(a) *8.02				

(a) Ice jam.
Minimum discharge, 19 ft^3/s Sept. 27, 28, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	69	48	60	43	54	32	173	301	172	86	73	31
2	64	49	65	43	42	35	163	280	158	82	67	30
3	57	49	69	42	43	45	159	250	148	78	63	32
4	58	53	69	42	50	62	156	230	135	74	61	52
5	51	57	68	41	56	58	144	215	124	69	55	63
6	45	60	68	39	58	56	132	193	111	66	52	70
7	42	60	68	78	56	58	126	176	102	76	50	68
8	40	57	67	90	50	60	126	165	100	72	47	69
9	41	57	62	70	48	110	126	161	101	63	42	79
10	40	59	60	60	49	300	122	151	98	59	41	72
11	38	58	55	58	50	550	118	135	97	63	37	63
12	37	59	53	50	49	800	117	142	99	75	36	55
13	35	60	52	49	47	900	115	129	96	75	33	49
14	34	66	52	37	46	760	113	124	90	115	33	46
15	33	69	57	37	46	550	112	118	86	207	46	43
16	34	77	52	37	43	400	110	114	82	238	55	39
17	34	73	49	32	44	390	107	109	81	247	57	34
18	36	68	49	32	39	290	106	109	81	236	44	31
19	36	68	49	36	37	265	105	107	83	225	37	29
20	36	66	56	39	38	260	105	107	80	195	33	28
21	36	52	57	41	35	220	106	105	72	171	32	25
22	37	65	60	47	36	180	106	100	80	166	32	24
23	35	76	68	47	34	160	113	109	92	136	32	24
24	35	87	74	47	33	190	95	164	88	119	29	23
25	34	88	60	50	44	275	126	507	88	109	25	23
26	34	84	62	62	43	401	300	720	97	99	30	21
27	32	76	54	50	38	358	250	484	104	90	31	20
28	33	55	60	49	34	312	239	336	110	82	37	20
29	35	59	56	53	---	286	278	266	106	85	35	21
30	38	60	50	55	---	240	307	220	94	84	35	20
31	43	---	44	65	---	197	---	190	---	82	33	---
TOTAL	1252	1915	1825	1521	1242	8800	4455	6517	3055	3624	1313	1204
MEAN	40.4	63.8	58.9	49.1	44.4	284	148	210	102	117	42.4	40.1
MAX	69	88	74	90	58	900	307	720	172	247	73	79
MIN	32	48	44	32	33	32	95	100	72	59	25	20
AC-FT	2480	3800	3620	3020	2460	17450	8840	12930	6060	7190	2600	2390
CFSM	.03	.04	.04	.03	.03	.18	.10	.14	.07	.08	.03	.03
IN.	.03	.05	.04	.04	.03	.21	.11	.16	.07	.09	.03	.03

CAL YR 1988 TOTAL 108048 MEAN 295 MAX 1710 MIN 28 AC-FT 214300 CFSM .19 IN. 2.60
WTR YR 1989 TOTAL 36723 MEAN 101 MAX 900 MIN 20 AC-FT 72840 CFSM .06 IN. .88

06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IA

LOCATION.--Lat 42°28'20", long 95°47'49", in NE1/4 NW1/4 sec.1, T.88 N., R.43 W., Woodbury County, Hydrologic Unit 10230003 on right bank 50 ft upstream from bridge on State Highway 31, 0.3 mi upstream from Bacon Creek, 0.5 mi west of Correctionville, 0.8 mi downstream from Pierson Creek, and at mile 56.0.

DRAINAGE AREA.--2,500 mi^2.

PERIOD OF RECORD.--May 1918 to July 1925, October 1928 to July 1932, June 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 856: 1919. WSP 1240: 1924-25, 1931, 1932 (M), 1937, 1945 (M), 1947 (M), 1949 (M). WSP 1440: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,096.49 ft above NGVD. May 28, 1918, to July 1, 1925 and Oct. 29, 1928 to July 15, 1929, nonrecording gage 0.2 mi downstream at datum 1.25 ft lower. July 16, 1929, to July 2, 1932, and June 15, 1936, to Nov. 7, 1938, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Nov. 28, Dec. 8-11, 14-17, Dec. 24 to Jan. 29, Feb. 1 to Mar. 11, and Mar. 15-21. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--62 years (water years 1919-24, 1929-31, 1937-89), 821 ft^3/s, 4.46 in/yr, 594,800 acre-ft/yr; median of yearly mean discharges, 640 ft^3/s, 3.5 in/yr, 464,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,800 ft^3/s Apr. 7, 1965, gage height, 25.86 ft; minimum daily discharge, 2.6 ft^3/s July 17, 25, 1936, caused by construction dam above gage; minimum daily discharge excluding regulation, 4.0 ft^3/s Oct. 9, 12, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 23 or 24, 1891, reached a stage of 29.34 ft, present datum, from levels to floodmark by U.S. Soil Conservation Service (discharge not determined).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	----	ice jam	*11.67	Mar. 12	0200	*2,930	10.83

Minimum discharge, 45 ft^3/s Aug. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	235	123	166	123	240	142	480	530	432	174	138	60
2	237	122	172	112	120	131	440	535	383	161	128	54
3	234	122	174	105	80	126	405	517	345	149	113	50
4	219	130	155	110	83	121	389	495	313	139	102	198
5	202	140	170	150	90	115	378	470	289	130	100	234
6	189	139	176	300	97	111	371	444	265	119	92	143
7	179	136	169	250	113	110	358	418	245	131	85	179
8	173	133	130	140	117	120	353	396	237	120	82	483
9	167	137	105	117	115	170	352	371	214	108	78	321
10	161	134	92	112	119	650	342	351	199	106	72	213
11	152	127	88	115	122	1800	334	337	190	97	66	171
12	147	140	124	116	127	2250	324	322	189	91	61	152
13	144	150	142	118	130	1460	310	304	183	100	59	134
14	144	149	138	122	127	1400	303	297	183	97	60	123
15	143	151	98	125	123	860	297	285	169	106	57	116
16	141	162	105	118	118	500	291	272	164	115	57	107
17	143	160	109	116	113	290	287	260	159	175	51	101
18	142	151	115	117	110	260	282	255	164	293	53	96
19	141	176	117	119	106	400	279	262	163	283	66	87
20	142	175	152	122	109	330	276	257	151	292	68	80
21	143	124	164	128	110	440	274	247	141	289	65	73
22	142	142	166	136	107	494	269	239	144	251	57	67
23	139	175	208	141	102	523	263	234	148	218	50	60
24	135	185	200	144	105	509	265	283	151	193	47	55
25	130	189	130	140	115	525	318	1440	162	176	46	53
26	129	197	132	130	135	540	534	1020	175	161	71	51
27	128	196	129	130	158	578	368	877	173	149	99	50
28	124	120	120	137	152	677	497	919	175	139	91	52
29	122	154	112	148	---	640	547	733	188	145	82	52
30	120	149	115	180	---	588	523	580	182	180	72	52
31	122	---	120	306	---	532	---	491	---	156	65	---
TOTAL	4869	4488	4293	4427	3343	17392	10709	14441	6276	5043	2333	3667
MEAN	157	150	138	143	119	561	357	466	209	163	75.3	122
MAX	237	197	208	306	240	2250	547	1440	432	293	138	483
MIN	120	120	88	105	80	110	263	234	141	91	46	50
AC-FT	9660	8900	8520	8780	6630	34500	21240	28640	12450	10000	4630	7270
CFSM	.06	.06	.06	.06	.05	.22	.14	.19	.08	.07	.03	.05
IN.	.07	.07	.06	.07	.05	.26	.16	.21	.09	.08	.03	.05

CAL YR 1988 TOTAL 196898 MEAN 538 MAX 2070 MIN 63 AC-FT 390500 CFSM .22 IN. 2.93
WTR YR 1989 TOTAL 81281 MEAN 223 MAX 2250 MIN 46 AC-FT 161200 CFSM .09 IN. 1.21

06607200 MAPLE RIVER AT MAPLETON, IA

LOCATION.--Lat 42°09'25", long 95°48'35", in SE1/4 SE1/4 sec.23, T.85 N., R.43 W., Monona County, Hydrologic Unit 10230005, on right bank at downstream side of bridge on State Highway 175, 1.0 mi downstream from Simmons Creek, 1.1 mi southwest of intersection of State Highways 175 and 141 in Mapleton, 2.1 mi upstream from McCleery Creek, and 16.0 mi upstream from mouth.

DRAINAGE AREA.--669 mi^2.

PERIOD OF RECORD.--October 1941 to current year.

REVISED RECORDS.--WSP 1310: 1942 (M), 1946 (M), 1948 (M). WSP 1440: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,085.86 ft above NGVD. See WSP 1730 for history of changes prior to Sept. 20, 1956.

REMARKS.--Estimated daily discharges: Nov. 28, 29, Dec. 2-4, 8-21, Dec. 23 to Jan. 21, Jan. 26-28, Feb. 1 to Mar. 10, and Mar. 18, 19. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--48 years, 266 ft^3/s, 5.40 in/yr, 192,700 acre-ft/yr; median of yearly mean discharges, 240 ft^3/s, 4.9 in/yr, 174,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,800 ft^3/s Sept. 12, 1978, gage height, 16.74 ft; maximum gage height, 22.1 ft June 12, 1950; no flow Sept. 21, 22, 1945 caused by temporary dam above gage; minimum daily discharge excluding regulation, 2.5 ft^3/s Feb. 17-20, 1959.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 29	0245	*5,470	*8.20	No other peak greater than base discharge.			

Minimum discharge, 33 ft^3/s, Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	199	100	120	110	250	110	147	115	154	86	64	37
2	164	100	100	86	120	100	144	111	139	84	58	35
3	142	100	115	96	66	105	141	108	157	82	53	34
4	130	102	100	115	70	92	137	106	150	81	52	49
5	125	101	111	140	80	86	135	107	118	78	50	159
6	119	100	120	800	90	82	136	102	113	76	49	109
7	116	98	116	300	110	90	136	99	109	77	47	97
8	115	97	100	120	90	120	140	97	121	78	46	236
9	114	98	92	140	86	500	136	95	116	74	43	233
10	111	97	86	130	105	1500	131	93	108	71	41	215
11	107	96	82	135	125	1220	128	90	106	69	40	144
12	105	111	130	140	135	892	126	88	117	68	39	115
13	104	115	170	145	130	433	124	86	104	67	39	103
14	103	107	140	170	120	327	120	85	103	66	39	95
15	103	105	90	152	110	275	118	84	101	71	42	89
16	102	109	100	140	100	252	116	83	99	69	44	84
17	102	104	120	136	94	213	114	80	98	69	40	81
18	102	107	150	146	88	185	114	81	101	187	38	76
19	104	120	170	170	86	200	112	86	98	73	39	72
20	103	117	300	180	95	207	112	88	94	60	38	68
21	102	112	270	195	90	171	111	83	91	53	39	64
22	101	113	221	212	85	182	110	80	125	49	43	61
23	101	127	180	189	80	180	107	79	113	48	37	57
24	100	127	130	139	95	178	106	337	101	47	35	57
25	99	138	92	119	140	168	107	583	118	44	35	55
26	98	147	100	100	240	163	104	421	105	44	46	54
27	99	140	96	105	210	163	102	202	101	43	64	52
28	98	120	92	115	140	164	112	161	95	42	57	51
29	98	130	90	129	---	162	125	1050	91	169	49	49
30	98	150	100	222	---	164	119	216	88	155	43	48
31	99	---	140	553	---	153	---	171	---	78	40	---
TOTAL	3463	3388	4023	5629	3230	8837	3670	5267	3334	2358	1389	2679
MEAN	112	113	130	182	115	285	122	170	111	76.1	44.8	89.3
MAX	199	150	300	800	250	1500	147	1050	157	187	64	236
MIN	98	96	82	86	66	82	102	79	88	42	35	34
AC-FT	6870	6720	7980	11170	6410	17530	7280	10450	6610	4680	2760	5310
CFSM	.17	.17	.19	.27	.17	.43	.18	.25	.17	.11	.07	.13
IN.	.19	.19	.22	.31	.18	.49	.20	.29	.19	.13	.08	.15

CAL YR 1988 TOTAL 73865 MEAN 202 MAX 2350 MIN 80 AC-FT 146500 CFSM .30 IN. 4.11
WTR YR 1989 TOTAL 47267 MEAN 129 MAX 1500 MIN 34 AC-FT 93750 CFSM .19 IN. 2.63

06607500 LITTLE SIOUX RIVER NEAR TURIN, IA

LOCATION.--Lat 41°57'52", long 95°58'21", in NW1/4 NE1/4 sec.33, T.83 N., R.44 W., Monona County, Hydrologic Unit 10230003, on left bank on downstream side of bridge on county highway E54, 1.0 mi east of gaging station on Monona-Harrison ditch near Turin, 2.5 mi downstream from Maple River, 3.8 mi south of Turin, 6.2 mi northeast of Blencoe, and at mile 13.5.

DRAINAGE AREA.--3,526 mi². Prior to Jan. 15, 1958, 4,426 mi², combined area above this station and Monona-Harrison ditch station 1.0 mi west.

PERIOD OF RECORD.--January 1958 to current year. April 1939 to May 1942 at site 4.7 mi downstream, published as "near Blencoe" June 1942 to January 1958 at site 1,200 ft east on old river channel; records not equivalent owing to diversion into Monona-Harrison ditch through equalizer ditch 1.5 mi upstream.

GAGE.--Water-stage encoder. Datum of gage is 1,019.85 ft above NGVD (U.S. Army Corps of Engineers bench mark). Prior to July 15, 1958, nonrecording gages near present site at different datums. July 15 to Sept. 3, 1958, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 10 to Mar. 18, Mar. 22-29, May 19-25, and June 15-20. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--31 years (water years 1959-89), 1,390 ft³/s, 5.35 in/yr, 1,007,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,200 ft³/s June 21, 1983, gage height, 26.54 ft; maximum gage height, 27.44 ft Feb. 19, 1971, backwater from ice; minimum daily discharge, 17 ft³/s Jan. 18-20, Jan. 28 to Feb. 1, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,500 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar. 12	1930	*4,500	(a) *20.05				

(a) Ice jam
Minimum discharge, 88 ft³/s Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	514	252	391	310	900	350	794	714	728	309	318	109
2	473	262	424	320	580	320	715	702	645	293	273	100
3	439	262	447	300	290	300	648	709	607	273	247	99
4	428	265	406	280	190	280	584	696	565	253	223	144
5	408	264	372	350	210	260	559	650	498	236	209	306
6	384	258	423	600	230	250	539	615	456	217	196	484
7	366	275	427	880	240	240	539	581	429	199	183	425
8	352	270	315	600	250	250	525	559	447	218	168	878
9	334	278	262	400	250	500	519	517	431	222	156	1140
10	323	277	235	310	250	1100	514	491	386	199	143	821
11	303	280	220	300	260	1500	504	454	378	184	126	546
12	292	318	250	310	270	3000	490	432	404	177	115	426
13	289	346	280	310	280	4500	475	406	382	165	109	369
14	283	338	320	320	280	3300	469	388	381	163	116	325
15	276	338	280	330	270	3000	448	371	377	192	106	289
16	271	354	250	340	260	2000	458	360	350	201	111	265
17	264	352	240	340	250	1300	434	350	340	202	104	242
18	259	354	260	330	240	960	433	350	350	505	95	223
19	266	367	300	320	230	863	430	360	340	490	97	198
20	277	400	360	320	230	1020	436	350	330	430	105	180
21	278	386	380	330	240	1030	421	330	347	430	116	165
22	274	358	430	350	240	918	413	325	351	418	121	148
23	264	381	480	370	240	993	414	320	357	384	112	132
24	259	418	470	390	230	924	406	400	323	345	96	130
25	261	449	350	400	230	898	391	850	378	315	92	132
26	253	481	300	390	260	901	435	1980	373	289	107	122
27	261	474	310	370	320	921	637	1390	340	266	177	121
28	239	274	310	360	370	972	528	1270	319	244	191	125
29	245	344	300	370	---	1030	674	2340	312	514	168	124
30	249	455	280	420	---	960	748	1160	315	639	140	121
31	253	---	290	600	---	869	---	848	---	382	129	---
TOTAL	9637	10130	10362	11920	8090	35709	15580	21268	12239	9354	4649	8889
MEAN	311	338	334	385	289	1152	519	686	408	302	150	296
MAX	514	481	480	880	900	4500	794	2340	728	639	318	1140
MIN	239	252	220	280	190	240	391	320	312	163	92	99
AC-FT	19110	20090	20550	23640	16050	70830	30900	42190	24280	18550	9220	17630
CFSM	.09	.10	.09	.11	.08	.33	.15	.19	.12	.09	.04	.08
IN.	.10	.11	.11	.13	.09	.38	.16	.22	.13	.10	.05	.09

CAL YR 1988 TOTAL 296930 MEAN 811 MAX 3000 MIN 150 AC-FT 589000 CFSM .23 IN. 3.13
WTR YR 1989 TOTAL 157827 MEAN 432 MAX 4500 MIN 92 AC-FT 313000 CFSM .12 IN. 1.67

06608500 SOLDIER RIVER AT PISGAH, IA

LOCATION.--Lat 41°49'50", long 95°55'54", in NW1/4 NE1/4 sec.14, T.81 N., R.44 W., Harrison County, Hydrologic Unit 10230001, on right bank at upstream side of bridge on county highway F20, at west edge of Pisgah, 0.4 mi downstream from Cobb Creek, 0.5 mi upstream from Mogger Ditch, and 13.1 mi upstream from mouth.

DRAINAGE AREA.--407 mi^2.

PERIOD OF RECORD.--March 1940 to current year.

REVISED RECORDS.--WSP 956: 1940 (M). WSP 1240: 1940, 1941 (M), 1947. WSP 1440: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,036.53 ft above NGVD. Prior to Oct. 11, 1954, nonrecording gage at same site and datum with supplementary water-stage recorder operating above 8.2 ft gage height Mar. 2, 1946 to Sept. 24, 1953. Prior to Feb. 1954, on left bank at downstream side of bridge. Prior to June 21, 1989, at site 100 ft upstream at same datum.

REMARKS.--Estimated daily discharges: Nov. 29, 19, and Dec. 9 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--49 years, 134 ft^3/s, 4.47 in/yr, 97,080 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft^3/s June 12, 1950, gage height, 28.17 ft; minimum daily discharge, 2.0 ft^3/s Jan. 2-10, 1945.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 8	0900	*4,110	*12.65				

Minimum discharge, 14 ft^3/s July 13, 14, 27, and 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	85	54	64	60	200	62	79	56	64	30	47	24
2	66	54	63	48	52	52	79	55	55	28	37	21
3	60	56	62	52	35	59	77	54	74	28	35	23
4	58	59	58	56	36	50	76	57	56	27	32	109
5	55	56	59	90	39	45	75	57	47	24	36	58
6	60	55	61	135	42	40	75	54	44	22	33	41
7	59	54	61	100	53	43	74	53	41	21	29	569
8	60	54	56	56	46	75	77	52	153	22	27	1660
9	59	55	49	70	43	200	71	50	89	21	26	465
10	58	54	44	60	57	793	68	46	56	18	24	138
11	56	53	42	62	66	373	67	44	51	17	23	84
12	52	73	74	63	72	192	66	44	97	16	22	65
13	55	81	110	64	74	132	66	43	66	15	22	57
14	56	65	76	79	70	121	65	42	45	17	23	53
15	55	63	48	70	65	113	65	41	43	23	23	50
16	54	76	58	60	60	106	67	41	42	27	22	46
17	53	75	86	56	56	98	66	40	39	25	21	42
18	54	73	110	59	48	96	65	41	44	36	19	39
19	54	76	100	64	44	103	66	45	43	53	25	36
20	56	70	92	62	56	97	63	44	36	30	23	34
21	57	64	76	66	48	86	62	42	31	23	23	31
22	55	66	92	76	41	91	61	40	291	22	21	29
23	54	68	80	74	39	89	59	40	125	21	20	28
24	53	69	72	70	70	87	59	40	56	20	18	29
25	55	70	64	65	110	86	57	61	124	19	20	31
26	53	77	71	60	210	84	54	45	67	17	82	30
27	56	78	62	65	180	88	54	39	47	16	135	29
28	52	56	60	76	100	90	65	49	39	15	67	29
29	54	68	58	110	---	86	66	763	34	766	41	28
30	54	73	58	230	---	84	60	151	31	200	31	28
31	57	---	70	450	---	81	---	75	---	72	26	---
TOTAL	1765	1945	2136	2708	2012	3802	2004	2304	2030	1691	1033	3906
MEAN	56.9	64.8	68.9	87.4	71.9	123	66.8	74.3	67.7	54.5	33.3	130
MAX	85	81	110	450	210	793	79	763	291	766	135	1660
MIN	52	53	42	48	35	40	54	39	31	15	18	21
AC-FT	3500	3860	4240	5370	3990	7540	3970	4570	4030	3350	2050	7750
CFSM	.14	.16	.17	.21	.18	.30	.16	.18	.17	.13	.08	.32
IN.	.16	.18	.20	.25	.18	.35	.18	.21	.19	.15	.09	.36

CAL YR 1988 TOTAL 35251 MEAN 96.3 MAX 769 MIN 35 AC-FT 69920 CFSM .24 IN. 3.22
WTR YR 1989 TOTAL 27336 MEAN 74.9 MAX 1660 MIN 15 AC-FT 54220 CFSM .18 IN. 2.50

06609500 BOYER RIVER AT LOGAN, IA

LOCATION.--Lat 41°38'33", long 95°46'57", in SE1/4 NW1/4 sec.19, T.79 N., R.42 W., Harrison County, Hydrologic Unit 10230007, on left bank 9 ft downstream from Chicago Central and Pacific Railroad bridge at Logan, 0.4 mi downstream from Elk Grove Creek, 10.5 mi upstream from Willow Creek, and 15.8 mi upstream from mouth.

DRAINAGE AREA.--871 mi^2.

PERIOD OF RECORD.--May 1918 to July 1925, November 1937 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 956: 1938-39. WSP 1240: 1918-19, 1920 (M), 1921, 1922 (M), 1924-25, 1938 (M), 1945. WSP 1440: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 1,009.38 ft above NGVD (Chicago and Northwestern Railway Company bench mark). See WSP 1918 for history of changes prior to Oct. 18, 1960.

REMARKS.--Estimated daily discharges: Nov. 27-28, Dec. 1, Dec. 7 to Jan. 30, and Feb. 1 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--57 years (water years 1919-24, 1939-89), 330 ft^3/s, 5.14 in/yr, 239,100 acre-ft/yr; median of yearly mean discharges, 280 ft^3/s, 4.4 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,000 ft^3/s Feb. 19, 1971, gage height, 22.65 ft, from floodmark; maximum gage height, 25.22 ft Mar. 1, 1965, backwater from ice; minimum daily discharge, 1.5 ft^3/s July 16, 1938.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 8	0930	*11,000	*15.75	No other peak greater than base discharge.			

Minimum discharge, 15 ft^3/s Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	252	98	130	94	350	190	138	95	195	115	94	24
2	200	98	163	82	150	170	134	90	177	108	69	18
3	162	103	149	86	60	160	129	86	398	104	60	18
4	136	101	135	96	62	140	122	89	306	100	51	387
5	126	99	122	130	68	125	124	90	177	102	44	240
6	120	99	129	300	70	115	118	85	141	97	47	119
7	117	100	135	200	90	130	116	81	127	91	57	797
8	115	92	120	125	78	300	124	80	489	84	44	5600
9	112	99	100	130	74	1000	124	75	315	87	38	2290
10	111	98	80	120	85	2460	114	74	174	83	31	813
11	105	97	72	125	100	1450	110	70	166	80	33	422
12	101	123	105	120	115	740	110	70	216	81	30	275
13	101	156	160	125	120	432	107	69	198	77	24	202
14	102	133	170	140	118	326	108	68	138	74	25	165
15	103	122	80	130	115	274	99	67	121	83	57	141
16	97	157	90	120	110	228	98	65	114	97	83	120
17	100	172	110	120	105	213	100	64	107	96	40	111
18	97	140	130	125	100	146	105	69	111	182	27	97
19	97	156	128	130	96	202	100	76	108	112	39	86
20	99	160	115	140	110	222	94	96	99	103	34	79
21	103	139	110	150	100	190	93	81	89	91	24	74
22	102	117	120	170	96	164	89	71	133	84	26	70
23	101	152	110	160	90	177	84	66	264	82	23	63
24	96	156	100	145	120	176	82	1340	182	80	19	66
25	97	151	90	140	180	167	85	1660	325	77	21	66
26	96	178	92	130	280	160	83	471	271	75	65	65
27	99	170	90	140	400	161	78	273	224	71	92	63
28	94	120	86	200	250	162	104	241	178	65	79	59
29	91	137	86	400	---	153	120	1160	144	1000	50	58
30	93	154	94	800	---	151	107	488	124	470	34	58
31	99	---	110	703	---	156	---	240	---	176	27	---
TOTAL	3524	3877	3511	5776	3692	10840	3199	7650	5811	4227	1387	12646
MEAN	114	129	113	186	132	350	107	247	194	136	44.7	422
MAX	252	178	170	800	400	2460	138	1660	489	1000	94	5600
MIN	91	92	72	82	60	115	78	64	89	65	19	18
AC-FT	6990	7690	6960	11460	7320	21500	6350	15170	11530	8380	2750	25080
CFSM	.13	.15	.13	.21	.15	.40	.12	.28	.22	.16	.05	.48
IN.	.15	.17	.15	.25	.16	.46	.14	.33	.25	.18	.06	.54

CAL YR 1988 TOTAL 33521 MEAN 91.6 MAX 752 MIN 17 AC-FT 66490 CFSM .11 IN. 1.43
WTR YR 1989 TOTAL 66140 MEAN 181 MAX 5600 MIN 18 AC-FT 131200 CFSM .21 IN. 2.82

06610000 MISSOURI RIVER AT OMAHA, NE

LOCATION.--Lat 41°15'32", long 95°55'20", in SE1/4 NW1/4 sec.23, T.15 N., R.13 E., Douglas County, Hydrologic Unit 10230006, on right bank on left side of concrete floodwall, at foot of Douglas Street, 275 ft downstream from Interstate 480 Highway bridge in Omaha, and at mile 615.9.

DRAINAGE AREA.--322,800 mi^2, approximately. The 3,959 mi^2 in Great Divide basin are not included.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1928 to current year. April 1872 to December 1899 (gage heights only) in reports of the Missouri River Commission and since January 1875, (gage heights only) in reports of the U.S. Weather Bureau.

REVISED RECORDS.--WSP 761: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 948.24 ft above NGVD. See WSP 1730 for history of changes prior to Sept. 30, 1936. Oct. 1, 1936 to Sept. 30, 1982 at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 18-21, Dec. 30 to Jan. 5, Feb. 5, and May 26. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform and U.S. National Weather Service gage-height telemeter at station.

AVERAGE DISCHARGE.--61 years, 30,850 ft^3/s, 22,350,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 396,000 ft^3/s Apr. 18, 1952, gage height, 40.20 ft, present datum; minimum, about 2,200 ft^3/s Jan. 6, 1937; minimum gage height, 6.85 ft, present datum, Feb. 5, 1989, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 54,100 ft^3/s Sept. 8, gage height, 21.19 ft; minimum daily discharge, 6,500 ft^3/s Feb. 5; minimum gage height, 6.85 ft Feb. 5, result of freeseup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34500	35700	16400	15500	17100	15600	32100	32900	33100	30900	35700	31300
2	31900	36100	16100	16600	16100	15200	31900	32800	33800	33000	34500	31500
3	31800	36300	16300	15500	13300	15700	31600	32600	34600	34100	33900	31900
4	31500	36700	16600	14800	9680	15200	31400	32600	33600	33400	33800	38200
5	31300	36600	16500	15000	6500	13300	31500	33200	33200	32000	33700	35200
6	31600	36400	16300	16500	9230	12900	31400	33800	33500	32400	33800	33000
7	33000	36500	16400	18900	20400	14500	31100	34000	33000	32700	33900	32300
8	33600	36000	16400	17600	18100	16400	30900	34000	33500	30200	33700	42600
9	34100	35800	16100	14700	18900	19200	31900	33400	34500	30900	33800	44500
10	35300	34700	15500	10800	18800	23600	32300	32900	33900	32800	33400	35100
11	35400	32900	15400	9940	18800	29100	32400	33300	33600	30700	33300	30500
12	35100	32600	15000	14000	19400	28000	32500	33800	33200	31000	33400	28100
13	35400	30700	14300	16300	20000	24400	33500	34000	34100	32700	33700	27800
14	35000	27600	15100	16600	20200	21700	34000	34100	34000	32100	33900	29000
15	35600	24000	17200	16100	19900	20700	33800	34200	32900	32300	34400	29700
16	36800	21600	15900	15700	19400	19700	33300	34300	32800	33300	34300	29500
17	37300	19600	14600	15700	18900	17400	33600	34300	33600	34300	34000	29700
18	37200	18100	14000	15700	18700	15400	33300	34200	33400	34300	33800	29900
19	36600	17500	14300	15900	18500	14200	33400	34700	33700	37400	34000	30000
20	36200	17300	15600	16000	18000	13600	33600	35600	33500	36900	34000	30100
21	36600	17300	17600	16100	16800	14100	33600	35400	32500	34100	34200	30300
22	36900	16800	16700	16000	16200	14400	33700	34800	33000	31800	34400	30400
23	36800	16400	16000	15600	17100	14700	34100	34100	33400	31500	35600	30400
24	36600	16300	16200	16100	16900	14700	34300	33700	33400	31800	34200	30400
25	36700	15900	16000	16300	15800	14800	34400	34500	34600	29700	33800	30800
26	37000	15900	14900	16000	16100	15400	34400	34200	34600	30100	33800	31000
27	36700	16500	14100	15500	17500	17700	34400	34000	34700	32000	34600	30900
28	36200	16400	14200	15200	16800	21300	34000	33900	32600	31300	34600	31100
29	36200	16000	14700	15400	---	25100	33600	35100	32400	32500	33200	31300
30	35800	15700	13500	16300	---	28600	33200	40200	33300	40100	32700	31600
31	35700	---	14500	16700	---	31400	---	34900	---	38500	32000	---
TOTAL	1090400	765900	482400	483040	473110	578000	989200	1059500	1006000	1020800	1052100	958100
MEAN	35170	25530	15560	15580	16900	18650	32970	34180	33530	32930	33940	31940
MAX	37300	36700	17600	18900	20400	31400	34400	40200	34700	40100	35700	44500
MIN	31300	15700	13500	9940	6500	12900	30900	32600	32400	29700	32000	27800
AC-FT	2163000	1519000	956800	958100	938400	1146000	1962000	2102000	1995000	2025000	2087000	1900000

CAL YR 1988 TOTAL 10993300 MEAN 30040 MAX 42200 MIN 12900 AC-FT 21810000
WTR YR 1989 TOTAL 9958550 MEAN 27280 MAX 44500 MIN 6500 AC-FT 19750000

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

LOCATION.--Water quality samples were collected from Interstate 80 highway bridge 2.0 mi downstream from gaging station. Samples for particle-size distribution were collected from boat cross-section 3.6 mi downstream from gaging station.

PERIOD OF RECORD.--Water years 1969-76, 1978 to current year. Daily sediment loads for April 1939 to September 1971 are in reports of U.S. Army Corps of Engineers.

PERIOD OF DAILY RECORD.--
CHEMICAL ANALYSES: July 1969 to June 1972.
SPECIFIC CONDUCTANCE: October 1972 to September 1976, January 1978 to September 1981.
WATER TEMPERATURES: October 1971 to September 1976, January 1978 to September 1981.
SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 950 microsiemens Dec. 4,5, 1980; minimum daily, 335 microsiemens Mar. 22, 1978.
WATER TEMPERATURES: Maximum daily, 32.0°C July 24, 1972; minimum daily, 0.0°C on many days during winter period.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,180 mg/L May 19, 1974; minimum daily mean, 165 mg/L Sept. 13, 1976.
SEDIMENT LOADS: Maximum daily, 1,060,000 tons May 19, 1974; minimum daily, 3,990 tons Jan. 14, 1975.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
06...	1015	31500	13.0	755
14...	1115	34800	13.0	750
17...	1200	37300	14.0	750
20...	1115	36100	13.0	750
24...	1135	36600	12.0	760
27...	1045	36700	12.0	750
31...	0830	37600	7.5	740
NOV				
03...	1215	34400	8.0	755
08...	1000	35900	7.0	755
15...	1145	24200	8.0	800
23...	1115	16800	5.0	850
30...	1305	15900	2.0	810
DEC				
14...	1115	14700	1.0	800
JAN 1989				
05...	1500	15900	1.0	810
23...	1130	15400	1.5	800
FEB				
13...	1315	20100	0.5	705
27...	1500	17700	1.5	760
MAR				
08...	1100	16300	1.5	775
27...	1330	17600	11.0	760
APR				
10...	1340	32100	7.0	700
13...	1100	33300	8.0	740
17...	1230	33200	11.0	740
20...	1200	33500	10.5	750
24...	1130	34300	16.0	750
27...	1230	34300	19.0	750
MAY				
03...	0900	32600	14.0	740
08...	1230	33900	13.0	760
MAY 1989				
11...	1200	33200	15.0	775
15...	1100	34300	18.0	760
19...	1115	34600	18.0	750
22...	1125	34900	20.0	780
30...	1230	41100	21.0	760
JUN				
02...	1200	33800	19.0	770
05...	1100	33100	20.5	740
08...	1200	33000	21.0	750
14...	0945	32600	20.5	740
19...	1115	34700	22.0	775
22...	1330	32000	22.0	765
26...	1130	34200	22.0	760
JUL				
03...	1200	34200	26.5	755
07...	1100	33400	26.0	680
10...	1130	33000	26.0	680
17...	1100	36700	24.0	720
20...	1200	37200	24.0	730
31...	1130	38900	26.0	775
AUG				
03...	1100	33600	26.0	775
07...	1130	35300	26.0	760
10...	1200	34400	27.0	790
14...	1200	33000	27.0	780
17...	1200	33800	27.0	780
21...	1240	34300	25.0	810
24...	1130	34100	24.0	780
28...	1215	34700	24.5	800
SEP				
06...	1030	33100	23.0	710
13...	1240	27700	15.0	840
18...	1405	29400	21.0	800
25...	1300	30700	15.0	760

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOCATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOCATION, TOTAL (FEET) (81903)	SAMPLING DEPTH (FEET) (00003)	STREAM VELOCITY, POINT (FPS) (81904)	SEDIMENT, SUSPENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
OCT											
06...	WATER TEMPERATURE, 13.0° C (0845-1240); DISCHARGE, 31,500 ft³/s.										
06...	1010	150	10.2	2.40	3.18	180	--	42	56	98	100
06...	1013	150	--	5.10	2.96	219	--	40	49	91	100
06...	1015	150	--	7.30	2.74	263	--	31	42	84	100
06...	1020	150	--	8.50	2.63	280	--	29	39	79	100
06...	1025	150	--	9.20	2.42	344	--	25	34	65	100
06...	1030	150	--	--	--	299	--	27	38	88	100
06...	1040	300	12.2	2.80	3.61	251	--	35	50	99	100
06...	1043	300	--	6.10	3.72	322	--	30	47	98	100
06...	1045	300	--	8.70	3.50	363	--	28	43	99	100
06...	1050	300	--	10.2	3.50	509	--	24	36	96	100
06...	1055	300	--	11.0	3.50	651	--	13	25	95	100
06...	1100	300	--	--	--	287	--	27	41	98	100
06...	1110	425	15.6	3.60	4.15	--	--	--	--	--	--
06...	1113	425	--	7.80	3.72	--	--	--	--	--	--
06...	1115	425	--	11.1	3.50	--	--	--	--	--	--
06...	1120	425	--	13.0	3.28	--	--	--	--	--	--
06...	1125	425	--	14.0	3.28	--	--	--	--	--	--
06...	1130	425	--	14.7	3.07	--	--	--	--	--	--
06...	1133	425	--	--	--	331	7	13	--	--	--
06...	1135	425	--	--	--	280	--	26	44	98	100
06...	1145	520	17.6	4.10	4.59	158	--	46	68	99	100
06...	1148	520	--	8.80	4.37	217	--	40	60	99	100
06...	1150	520	--	12.6	3.83	334	--	24	41	96	100
06...	1155	520	--	14.7	3.61	353	--	29	45	94	100
06...	1200	520	--	15.8	3.18	402	--	24	40	96	100
06...	1203	520	--	16.6	2.85	531	--	17	32	95	100
06...	1205	520	--	--	--	255	--	37	52	98	100
06...	1220	605	20.0	4.60	4.37	142	--	62	77	97	100
06...	1223	605	--	10.0	4.15	151	--	52	67	98	100
06...	1225	605	--	14.3	3.61	156	--	52	67	97	100
06...	1230	605	--	16.7	3.28	201	--	44	57	96	100
06...	1235	605	--	18.0	2.63	266	--	33	44	82	100
06...	1238	605	--	18.8	2.63	360	--	25	36	85	100
06...	1240	605	--	--	--	146	--	57	71	99	100

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOCATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOCATION, TOTAL (FEET) (81903)	SAMPLING DEPTH (FEET) (00003)	STREAM VELOCITY, POINT (FPS) (81904)	SEDIMENT, SUSPENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
MAY											
03...	WATER TEMPERATURE, 14.0° C (1010-1245); DISCHARGE, 32,600 ft³/s.										
03...	1010	130	12.2	2.80	3.28	171	--	60	73	98	100
03...	1014	130	--	6.10	3.39	165	--	60	71	97	100
03...	1018	130	--	8.70	2.96	197	--	48	61	95	100
03...	1022	130	--	10.2	2.63	275	--	36	45	74	100
03...	1026	130	--	11.0	2.53	385	--	29	37	78	100
03...	1030	130	--	--	--	161	--	56	65	96	100
03...	1040	275	12.8	3.00	3.94	288	--	40	52	97	100
03...	1043	275	--	6.40	3.72	366	--	39	52	96	100
03...	1046	275	--	9.10	3.22	329	--	40	52	97	100
03...	1049	275	--	10.7	3.39	402	--	27	41	88	100
03...	1052	275	--	11.5	3.28	395	--	25	40	94	100
03...	1055	275	--	12.0	3.07	476	--	24	36	88	100
03...	1100	275	--	--	--	277	--	37	51	97	100
03...	1115	435	15.4	3.60	4.32	--	--	--	--	--	--
03...	1117	435	--	7.70	4.04	--	--	--	--	--	--
03...	1119	435	--	11.0	3.72	--	--	--	--	--	--
03...	1121	435	--	12.8	3.61	--	--	--	--	--	--
03...	1123	435	--	13.9	3.18	--	--	--	--	--	--
03...	1125	435	--	14.5	3.28	--	--	--	--	--	--
03...	1130	435	--	--	--	306	--	29	47	95	100
03...	1135	435	--	--	--	391	7	14	--	--	--
03...	1145	530	17.4	4.00	4.59	187	--	53	72	99	100
03...	1148	530	--	8.70	4.15	189	--	52	67	100	--
03...	1152	530	--	12.4	4.04	266	--	36	53	99	100
03...	1155	530	--	14.5	3.61	341	--	36	52	97	100
03...	1158	530	--	15.7	3.83	415	--	27	42	87	100
03...	1202	530	--	16.4	3.39	497	--	19	34	89	100
03...	1205	530	--	--	--	206	--	48	65	98	100
03...	1215	615	18.6	4.30	4.37	138	--	68	84	100	--
03...	1220	615	--	9.30	4.15	147	--	68	82	97	100
03...	1225	615	--	13.3	3.72	183	--	58	69	100	--
03...	1230	615	--	15.5	3.39	158	--	51	66	97	100
03...	1235	615	--	16.7	2.96	149	--	59	71	96	100
03...	1240	615	--	17.5	3.07	168	--	58	73	98	100
03...	1245	615	--	--	--	112	--	75	82	98	100

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
JUN											
14...	WATER TEMPERATURE, 20.5° C (0945-1230); DISCHARGE, 32,600 ft^3/s.										
14...	0945	150	10.4	2.40	3.61	168		65	76	95	100
14...	0948	150		5.20	3.28	164		74	85	100	
14...	0951	150	--	7.40	2.96	193	--	57	66	95	100
14...	0954	150	--	8.70	3.07	256	--	45	54	95	100
14...	0959	150	--	9.40	2.42	261	--	41	50	94	100
14...	1000	150	--	--	--	187	--	63	71	97	100
14...	1010	280	12.0	2.80	4.15	203	--	61	74	97	100
14...	1013	280	--	6.00	4.04	269	--	49	62	99	100
14...	1016	280	--	8.60	3.72	304	--	44	57	97	100
14...	1019	280	--	10.0	3.18	425	--	31	42	90	100
14...	1021	280	--	10.8	2.74	359	--	32	44	94	100
14...	1025	280	--	--	--	301	--	44	53	95	100
14...	1032	435	--	--	--	470	8	16	--	--	--
14...	1040	435	18.4	4.30	4.37	--	--	--	--	--	--
14...	1046	435	--	9.20	3.39	--	--	--	--	--	--
14...	1052	435	--	13.1	2.85	--	--	--	--	--	--
14...	1058	435	--	15.3	1.98	--	--	--	--	--	--
14...	1104	435	--	16.6	1.65	--	--	--	--	--	--
14...	1115	435	--	17.3	1.55	248	--	41	55	97	100
14...	1125	525	18.0	4.20	4.59	202	--	58	72	99	100
14...	1128	525	--	9.00	4.37	243	--	55	70	99	100
14...	1131	525	--	12.9	3.83	336	--	37	52	99	100
14...	1134	525	--	15.0	3.50	434	--	28	45	95	100
14...	1137	525	--	16.2	3.18	581	--	26	42	94	100
14...	1140	525	--	17.0	2.96	636	--	19	33	89	100
14...	1145	525	--	--	--	262	--	44	60	99	100
14...	1205	610	18.6	4.30	4.26	146	--	77	93	100	--
14...	1209	610	--	9.30	4.04	160	--	70	82	99	100
14...	1213	610	--	13.3	3.39	193	--	75	86	100	--
14...	1217	610	--	15.5	3.28	196	--	70	85	99	100
14...	1221	610	--	16.7	3.18	193	--	67	81	97	100
14...	1225	610	--	17.5	2.74	177	--	73	86	97	100
14...	1230	610	--	--	--	143	--	83	95	100	--

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
JUL											
26...	WATER TEMPERATURE, 26.0K C (1000-1240); DISCHARGE, 29,700 ft^3/s.										
26...	1000	150	10.8	2.50	3.18	164	--	66	73	96	100
26...	1005	150	--	5.40	2.96	171	--	67	77	99	100
26...	1010	150	--	7.70	2.59	174	--	57	67	96	100
26...	1015	150	--	9.00	2.53	261	--	45	52	94	100
26...	1020	150	--	9.70	2.09	294	--	34	40	91	100
26...	1025	150	--	--	--	208	--	54	64	96	100
26...	1040	310	11.2	2.60	4.15	187	--	59	74	100	--
26...	1045	310	--	5.60	3.72	315	--	39	49	96	100
26...	1050	310	--	8.00	3.22	319	--	36	49	95	100
26...	1055	310	--	9.30	3.24	453	--	26	36	94	100
26...	1100	310	--	10.1	2.94	255	--	46	58	97	100
26...	1105	435	--	--	--	320	10	22	--	--	--
26...	1110	435	16.4	3.80	4.33	--	--	--	--	--	--
26...	1114	435	--	8.20	3.85	--	--	--	--	--	--
26...	1118	435	--	11.7	3.37	--	--	--	--	--	--
26...	1122	435	--	13.7	2.92	--	--	--	--	--	--
26...	1126	435	--	14.8	2.96	--	--	--	--	--	--
26...	1128	435	--	15.4	2.66	--	--	--	--	--	--
26...	1130	435	--	--	--	229	--	43	58	98	100
26...	1145	535	16.8	3.90	4.67	173	--	67	88	100	--
26...	1149	535	--	8.40	4.41	195	--	58	76	99	100
26...	1153	535	--	12.0	4.04	205	--	58	75	100	--
26...	1157	535	--	14.0	3.09	290	--	40	57	98	100
26...	1201	535	--	15.1	2.66	320	--	34	50	98	100
26...	1205	535	--	15.8	2.68	369	--	30	46	95	100
26...	1210	535	--	--	--	190	--	55	70	100	--
26...	1220	625	18.0	4.20	4.17	120	--	92	95	100	--
26...	1224	625	--	9.00	3.94	96	--	88	98	100	--
26...	1228	625	--	12.9	3.70	124	--	86	95	100	--
26...	1232	625	--	15.0	3.28	117	--	85	96	100	--
26...	1236	625	--	16.2	3.07	119	--	86	94	100	--
26...	1238	625	--	17.0	2.94	133	--	88	97	100	--
26...	1240	625	--	--	--	108	--	89	96	100	--

06610000 MISSOURI RIVER AT OMAHA, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
SEP											
06...	WATER TEMPERATURE, 23.0° C (1020-1235); DISCHARGE, 28,900 ft^3/s.										
06...	1020	150	11.2	2.60	3.46	692	--	94	97	99	100
06...	1024	150	--	5.60	3.24	683	--	94	96	99	100
06...	1028	150	--	8.00	2.98	779	--	85	88	98	100
06...	1032	150	--	9.30	2.42	752	--	87	90	99	100
06...	1036	150	--	10.1	2.37	828	--	82	85	99	100
06...	1040	150	--	11.2	3.00	724	--	91	94	100	--
06...	1050	290	14.0	3.20	4.15	668	--	94	97	100	--
06...	1054	290	--	7.00	3.94	683	--	91	94	99	100
06...	1058	290	--	10.0	3.07	789	--	80	85	99	100
06...	1102	290	--	11.7	2.85	867	--	73	79	98	100
06...	1106	290	--	12.6	2.63	921	--	72	78	99	100
06...	1108	290	--	13.2	2.20	1020	--	64	71	98	100
06...	1110	290	--	--	--	745	--	85	89	99	100
06...	1118	440	15.5	3.60	4.37	--	--	--	--	--	--
06...	1120	440	--	7.70	3.94	--	--	--	--	--	--
06...	1122	440	--	11.0	3.72	--	--	--	--	--	--
06...	1124	440	--	12.8	3.50	--	--	--	--	--	--
06...	1126	440	--	13.9	3.50	--	--	--	--	--	--
06...	1128	440	--	14.5	3.18	--	--	--	--	--	--
06...	1131	440	--	--	--	709	--	83	88	100	--
06...	1135	440	--	--	--	761	36	75	--	--	--
06...	1145	535	18.0	4.20	4.70	626	--	92	97	100	--
06...	1148	535	--	9.00	4.37	628	--	91	97	100	--
06...	1151	535	--	12.9	4.15	776	--	76	83	99	100
06...	1154	535	--	15.0	4.15	747	--	79	86	100	--
06...	1157	535	--	16.2	3.94	829	--	72	79	98	100
06...	1200	535	--	17.0	3.50	997	--	61	70	98	100
06...	1203	535	--	--	--	666	--	86	91	100	--
06...	1215	630	18.0	4.20	3.94	545	--	99	100	--	--
06...	1218	630	--	9.00	3.94	568	--	97	99	100	--
06...	1221	630	--	12.9	3.72	567	--	97	100	--	--
06...	1224	630	--	15.0	3.72	579	--	98	99	100	--
06...	1227	630	--	16.2	3.28	562	--	97	99	100	--
06...	1229	630	--	17.0	2.85	572	--	97	99	100	
06...	1231	630	--	--	--	554	--	98	100	--	

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAM-PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)
OCT								
06...	1143	5	0	3	18	98	100	--
MAY								
03...	1315	5	--	0	34	85	98	100
JUN								
14...	1300	5	0	1	28	99	100	--
JUL								
26...	1300	4	0	1	29	96	99	100
SEP								
06...	1300	5	1	1	28	98	100	--

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE

LOCATION.--Lat 40°40'55", long 95°50'48", in NW1/4 NE1/4 sec.9, T.8 N., R.14 E., Otoe County, Hydrologic Unit 10240001, on right bank 2.0 mi upstream from Highway 2 Bridge at Nebraska City, and at mile 562.6.

DRAINAGE AREA .--410,000 mi^2, approximately. The 3,959 mi^2 in Great Divide basin are not included.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1929 to current year. Gage-height records collected in this vicinity from August 1878 to December 1899 are contained in reports of Missouri River Commission.

REVISED RECORDS.--WSP 761: Drainage area.

GAGE.--Water-stage encoder. Datum of gage is 905.36 ft above NGVD, supplementary adjustment of 1954. See WSP 1918 or 1919 for history of changes prior to Apr. 1, 1963.

REMARKS.--Estimated daily discharges: Feb. 21, 22, July 14-16, and Sept. 10, 11. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--60 years, 37,000 ft^3/s, 26,810,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 414,000 ft^3/s Apr. 19, 1952; maximum gage height, 27.66 ft Apr. 18, 1952; minimum discharge, 1,600 ft^3/s Dec. 31, 1946 (discharge measurement); minimum gage height observed, -0.28 ft Dec. 24, 1960, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 87,300 ft^3/s Sept. 9, gage height, 18.00 ft; minimum daily discharge, 8,010 ft^3/s Feb. 6, gage height, 0.92 ft, result of freezup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	40900	36500	19300	15700	25600	23200	35000	36500	34700	38600	36600	32600
2	38700	36800	20600	17100	25100	22400	34800	36400	34100	37300	35800	32700
3	37700	36900	20400	18100	18400	22500	34300	36000	35600	38400	35400	32600
4	37700	37700	19700	17700	13600	22400	34600	36000	35200	38400	35000	37700
5	36200	38000	20300	17400	9460	20200	35400	36000	34600	37200	35000	44500
6	37300	38000	20200	19600	8010	18300	35100	36000	34400	35600	34700	44100
7	36400	37900	20200	22800	13400	18700	35200	36100	34300	35600	34600	42500
8	37000	38200	19900	23200	22000	20800	35100	35800	35100	34800	34700	50400
9	36800	38400	20100	19400	20900	23800	35100	35400	36100	33100	34500	81600
10	37400	36500	19700	15500	21800	29000	35000	34400	35500	34000	34400	61000
11	37000	34800	17900	13400	22000	35700	35300	34100	35300	33900	34400	44000
12	36900	33900	17600	14000	22500	43200	35400	34000	35200	32000	34100	38800
13	37100	33100	17000	17400	23500	44400	35700	34300	35300	33100	34300	36000
14	37500	31000	16500	19400	23600	39400	36300	34400	35400	34500	34400	34700
15	37400	28600	17600	19600	23300	34000	35900	34800	34800	34500	34600	34800
16	38200	27200	19400	19300	22800	30900	35700	34700	33900	34600	35000	34600
17	38900	25100	19400	19400	22500	27600	35500	34800	34100	31800	34700	34200
18	38700	22800	18100	20300	22700	25300	35000	35100	34500	38300	34400	34300
19	38800	21000	17300	20600	22900	22600	35500	35500	34000	40000	34400	33900
20	39000	20600	18500	20800	22900	20500	34300	35900	34500	41200	34800	33600
21	39000	20500	20300	21600	21500	20700	34700	36100	34100	39800	34700	33300
22	38400	20100	21900	21600	20000	20300	34800	35600	34900	38000	35300	33700
23	38300	19500	21900	21100	20800	20500	35200	35900	35200	36700	35900	33300
24	37700	19700	22200	21500	22100	20500	35300	36200	34900	36600	35700	32600
25	37600	19300	20900	22400	21700	20700	35100	36900	42700	35500	34600	32800
26	37300	19400	20000	22600	21400	20500	35600	37900	42000	34400	34300	33100
27	37600	20200	18600	21900	22500	21700	36200	36700	37200	34600	34400	32800
28	37000	20000	18100	21000	23800	24400	39500	36600	37200	34900	34800	32900
29	36800	20600	18100	21900	---	28300	36800	36400	36200	33600	34100	32900
30	36500	19300	16800	23200	---	32500	36700	38800	39400	36400	33100	33400
31	36400	---	15300	23800	---	33700	---	38200	---	39300	33000	---
TOTAL	1168200	851600	593800	613300	580770	808700	1064100	1111500	1070400	1116700	1075700	1149400
MEAN	37680	28390	19150	19780	20740	26090	35470	35850	35680	36020	34700	38310
MAX	40900	38400	22200	23800	25600	44400	39500	38800	42700	41200	36600	81600
MIN	36200	19300	15300	13400	8010	18300	34300	34000	33900	31800	33000	32600
AC-FT	2317000	1689000	1178000	1216000	1152000	1604000	2111000	2205000	2123000	2215000	2134000	2280000

CAL YR 1988 TOTAL 12321100 MEAN 33660 MAX 48100 MIN 15300 AC-FT 24440000
WTR YR 1989 TOTAL 11204170 MEAN 30700 MAX 81600 MIN 8010 AC-FT 22220000

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

WATER-QUALITY RECORDS

LOCATION.--Samples for particle size distribution were collected from boat cross-section 0.7 mi upstream from gage.

PERIOD OF RECORD.--May 1951 to current year. Daily sediment loads August 1957 to September 1971 in reports of U.S. Army Corps of Engineers.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: May 1951 to September 1976.
WATER TEMPERATURES: May 1951 to September 1976.
SEDIMENT DISCHARGE: October 1971 to September 1976.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 994 microsiemens Dec. 17, 1962; minimum daily, 273 microsiemens June 17, 1964.
WATER TEMPERATURES: Maximum daily, 31°C July 26, 1977; minimum, 0.0°C on many days during winter periods.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 8,220 mg/L May 19, 1974; minimum daily mean, 137 mg/L Jan. 14, 1975.
SEDIMENT LOADS: Maximum daily, 1,590,000 tons May 19, 1974; minimum daily, 4,050 tons Jan. 17, 1972.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988				
03...	1045	37400	16.0	710
11...	0850	37100	13.0	700
13...	1250	37300	13.0	730
19...	1320	38900	13.0	740
27...	1245	37800	9.0	780
NOV				
02...	1220	38400	8.0	755
09...	1330	40700	7.5	660
17...	1215	25600	6.0	710
22...	1145	20300	4.5	730
30...	1245	19100	2.0	780
DEC				
07...	0945	20500	1.5	790
15...	1310	17500	1.0	790
20...	1415	18600	0.0	790
JAN 1989				
05...	1200	17800	0.0	850
17...	1315	18800	1.5	840
27...	0900	22000	2.0	730
31...	1715	23700	2.5	760
FEB				
13...	1515	23600	0.0	740
MAR				
29...	1100	28100	12.0	700
APR				
03...	1300	34300	9.0	670
07...	1300	35200	10.0	690
12...	1300	35300	8.0	730
18...	1400	35000	10.5	750
25...	1050	35100	19.0	740
28...	1320	40500	20.0	740
MAY				
02...	1100	36500	15.0	735
MAY 1989				
09...	1440	35100	15.0	750
12...	1415	33800	16.5	762
16...	1500	34500	18.0	762
23...	1245	36000	20.0	780
26...	1300	38200	20.0	740
JUN				
01...	1400	33100	19.0	750
09...	1345	36200	23.0	770
13...	1435	35200	20.0	745
20...	1115	32100	22.0	780
23...	0930	35000	21.0	775
28...	1500	36400	22.0	770
JUL				
03...	1330	38200	27.5	760
06...	1300	34300	26.0	760
12...	0900	31900	25.0	690
17...	1230	34600	25.0	810
21...	0930	40100	24.0	740
25...	1315	35400	26.0	780
AUG				
01...	1200	36700	26.0	770
04...	1200	35000	27.0	780
09...	1130	33300	26.0	770
15...	1200	31800	25.0	820
18...	1200	31700	26.0	770
23...	1230	35700	26.0	760
29...	0900	34100	23.0	775
SEP				
01...	0830	30900	22.5	760
12...	1130	38700	18.0	640
15...	1610	34700	18.0	760
20...	1430	33500	22.0	775
25...	1430	32700	16.0	800
29...	1030	32800	17.0	800

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOCATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOCATION, TOTAL (FEET) (81903)	SAMPLING DEPTH (FEET) (00003)	STREAM VELOCITY, POINT (FPS) (81904)	SEDIMENT, SUSPENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
OCT												
03...	WATER TEMPERATURE, 16.0° C (1040-1320); DISCHARGE, 37,400 ft³/s.											
03...	1040	55.0	16.6	3.80	5.24	169	--	80	93	100	--	--
03...	1043	55.0	--	8.30	4.59	176	--	72	85	100	--	--
03...	1045	55.0	--	11.9	4.37	178	--	73	83	100	--	--
03...	1050	55.0	--	13.8	3.50	201	--	62	73	98	100	--
03...	1055	55.0	--	14.9	3.07	225	--	57	71	97	100	--
03...	1100	55.0	--	15.6	2.53	256	--	47	60	94	100	--
03...	1105	55.0	--	--	--	183	--	69	85	100	--	--
03...	1115	165	12.4	2.80	6.00	244	--	53	66	100	--	--
03...	1118	165	--	6.10	6.00	393	--	36	52	99	100	--
03...	1120	165	--	8.70	5.45	599	--	25	39	99	100	--
03...	1125	165	--	10.7	5.24	599	--	25	38	99	100	--
03...	1130	165	--	11.0	4.91	656	--	20	34	98	100	--
03...	1135	165	--	--	--	478	--	28	42	99	100	--
03...	1145	290	12.8	3.00	6.32	--	--	--	--	--	--	--
03...	1148	290	--	6.40	5.24	--	--	--	--	--	--	--
03...	1150	290	--	9.10	4.59	--	--	--	--	--	--	--
03...	1155	290	--	10.7	4.26	--	--	--	--	--	--	--
03...	1158	290	--	11.5	4.15	--	--	--	--	--	--	--
03...	1159	290	--	--	--	715	8	14	--	--	--	--
03...	1200	290	--	12.0	4.26	--	--	--	--	--	--	--
03...	1205	290	--	--	--	607	--	24	35	96	100	--
03...	1220	390	13.2	3.10	4.91	219	--	71	81	97	100	--
03...	1223	390	--	6.60	4.37	220	--	68	79	97	100	--
03...	1225	390	--	9.40	4.04	282	--	52	61	94	100	--
03...	1230	390	--	11.0	4.04	362	--	47	57	85	100	--
03...	1233	390	--	11.9	4.15	349	--	44	53	83	99	100
03...	1235	390	--	12.4	3.83	488	--	34	42	70	99	100
03...	1240	390	--	--	--	283	--	58	65	91	100	--
03...	1250	535	18.6	4.30	3.72	179	--	91	97	100	--	--
03...	1255	535	--	9.30	2.96	169	--	95	98	100	--	--
03...	1300	535	--	13.3	2.63	183	--	91	97	100	--	--
03...	1305	535	--	15.5	2.53	182	--	91	97	100	--	--
03...	1310	535	--	16.7	2.53	189	--	92	98	100	--	--
03...	1315	535	--	17.5	1.98	190	--	87	96	100	--	--
03...	1320	535	--	--	--	174	--	93	98	100	--	--

DATE	TIME	SAMPLE LOCATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOCATION, TOTAL (FEET) (81903)	SAMPLING DEPTH (FEET) (00003)	STREAM VELOCITY, POINT (FPS) (81904)	SEDIMENT, SUSPENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
MAY												
02...	WATER TEMPERATURE, 15.0° C (1045-1330; DISCHARGE, 36,500 ft³/s.											
02...	1045	50.0	12.2	2.80	3.28	184	--	76	91	100	--	--
02...	1050	50.0	--	8.70	4.59	223	--	62	73	97	100	--
02...	1055	50.0	--	12.4	3.72	245	--	55	66	96	100	--
02...	1100	50.0	--	14.5	3.39	300	--	49	62	94	100	--
02...	1105	50.0	--	15.7	3.18	331	--	43	55	89	100	--
02...	1110	50.0	--	16.4	2.63	478	--	33	43	78	100	--
02...	1115	50.0	--	--	--	189	--	62	74	96	100	--
02...	1130	150	16.6	3.80	5.35	320	--	47	64	99	100	--
02...	1133	150	--	8.30	4.80	368	--	44	58	98	100	--
02...	1136	150	--	11.9	4.26	496	--	31	46	98	100	--
02...	1139	150	--	13.8	4.26	591	--	27	42	97	100	--
02...	1142	150	--	14.9	3.18	718	--	20	32	97	100	--
02...	1145	150	--	15.6	3.18	813	--	19	30	94	100	--
02...	1150	150	--	--	--	432	--	35	50	98	100	--
02...	1200	240	13.5	3.10	5.67	--	--	--	--	--	--	--
02...	1203	240	--	6.60	5.35	--	--	--	--	--	--	--
02...	1206	240	--	9.40	5.35	--	--	--	--	--	--	--
02...	1209	240	--	11.0	4.48	--	--	--	--	--	--	--
02...	1212	240	--	11.9	4.37	--	--	--	--	--	--	--
02...	1215	240	--	12.4	3.83	--	--	--	--	--	--	--
02...	1220	240	--	--	--	2030	--	83	87	100	--	--
02...	1230	240	--	--	--	689	6	14	--	--	--	--
02...	1240	370	13.2	3.10	4.70	232	--	63	79	97	100	--
02...	1243	370	--	6.60	3.83	262	--	57	72	98	100	--
02...	1246	370	--	9.40	3.72	300	--	51	65	95	100	--
02...	1249	370	--	11.0	3.94	393	--	41	56	86	100	--
02...	1252	370	--	11.9	3.94	416	--	39	52	88	100	--
02...	1255	370	--	12.4	3.50	461	--	33	45	78	100	--
02...	1300	370	--	--	--	281	--	51	67	94	100	--
02...	1310	495	15.0	3.50	4.37	182	--	83	96	99	100	--
02...	1313	495	--	7.50	3.50	179	--	83	95	99	100	--
02...	1316	495	--	10.7	3.28	196	--	75	86	97	100	--
02...	1319	495	--	12.5	2.74	212	--	72	84	98	100	--
02...	1322	495	--	13.5	2.42	230	--	69	79	95	100	--
02...	1325	495	--	14.1	2.09	284	--	57	68	91	100	--
02...	1328	495	--	--	--	187	--	78	89	100	--	--

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
JUN												
13...	WATER TEMPERATURE, 20.5° C (1020-1335; DISCHARGE, 35,200 ft³/s.											
13...	1020	50.0	17.0	3.90	4.91	152	--	88	96	100	--	--
13...	1026	50.0	--	8.50	4.37	216	--	83	92	98	100	--
13...	1032	50.0	--	12.1	3.72	164	--	79	92	98	100	--
13...	1038	50.0	--	14.2	3.28	192	--	74	83	96	100	--
13...	1044	50.0	--	15.3	3.07	253	--	64	74	92	100	--
13...	1050	50.0	--	16.0	2.63	433	--	30	34	49	97	100
13...	1100	50.0	--	--	--	163	--	83	93	99	100	--
13...	1115	155	14.6	3.40	5.56	285	--	61	71	98	100	--
13...	1118	155	--	7.30	4.91	307	--	51	64	99	100	--
13...	1121	155	--	10.4	4.91	367	--	43	54	98	100	--
13...	1124	155	--	12.2	4.26	500	--	31	42	93	100	--
13...	1127	155	--	13.1	3.94	580	--	25	35	91	100	--
13...	1130	155	--	13.7	3.50	665	--	22	33	93	100	--
13...	1135	155	--	--	--	285	--	47	59	97	100	--
13...	1150	270	14.4	3.30	5.13	--	--	--	--	--	--	--
13...	1154	270	--	7.20	5.02	--	--	--	--	--	--	--
13...	1158	270	--	10.3	4.80	--	--	--	--	--	--	--
13...	1202	270	--	12.0	3.72	--	--	--	--	--	--	--
13...	1208	270	--	13.0	3.28	--	--	--	--	--	--	--
13...	1212	270	--	13.6	2.53	--	--	--	--	--	--	--
13...	1215	270	--	--	--	533	--	35	47	98	100	--
13...	1220	270	--	--	--	669	7	17	--	--	--	--
13...	1225	380	14.0	3.20	4.15	226	--	82	91	97	100	--
13...	1230	380	--	7.00	3.94	267	--	71	82	100	--	--
13...	1235	380	--	10.0	3.61	289	--	61	71	94	100	--
13...	1240	380	--	11.7	3.61	325	--	52	63	90	100	--
13...	1245	380	--	12.6	3.18	292	--	53	62	91	100	--
13...	1250	380	--	13.2	2.85	400	--	41	52	83	100	--
13...	1255	380	--	--	--	249	--	73	83	97	100	--
13...	1305	505	16.2	3.10	4.15	200	--	91	98	100	--	--
13...	1310	505	--	8.10	3.72	180	--	92	97	100	--	--
13...	1315	505	--	11.6	3.28	218	--	92	98	100	--	--
13...	1320	505	--	13.5	3.07	218	--	91	97	100	--	--
13...	1325	505	--	14.6	2.63	234	--	85	95	99	100	--
13...	1330	505	--	15.2	2.20	194	--	87	94	97	100	--
13...	1335	505	--	--	--	197	--	91	98	100	--	--

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
JUL											
25...	WATER TEMPERATURE, 26.0° C (1040-1335); DISCHARGE, 35,400 ft³/s.										
25...	1040	135	17.0	3.90	4.37	144	--	93	99	100	--
25...	1044	135	--	8.50	4.37	149	--	90	98	100	--
25...	1048	135	--	12.1	3.81	150	--	90	99	100	--
25...	1052	135	--	14.2	3.61	164	--	85	95	100	--
25...	1056	135	--	15.3	3.28	171	--	83	94	100	--
25...	1100	135	--	16.0	2.68	205	--	70	79	93	100
25...	1105	135	--	--	--	159	--	91	98	100	--
25...	1125	255	13.4	3.10	5.45	219	--	71	83	100	--
25...	1129	255	--	6.70	5.06	212	--	66	78	100	--
25...	1137	255	--	11.2	4.70	404	--	40	54	99	100
25...	1141	255	--	12.1	4.54	441	--	37	53	98	100
25...	1143	255	--	12.6	4.46	398	--	40	54	99	100
25...	1145	255	--	--	--	274	--	53	64	100	--
25...	1200	350	13.0	3.00	5.00	--	--	--	--	--	--
25...	1204	350	--	6.50	4.91	198	--	--	--	--	--
25...	1208	350	--	9.30	4.52	--	--	--	--	--	--
25...	1212	350	--	10.8	4.09	--	--	--	--	--	--
25...	1216	350	--	11.7	4.07	--	--	--	--	--	--
25...	1218	350	--	12.2	3.63	--	--	--	--	--	--
25...	1220	350	--	--	--	399	--	42	53	97	100
25...	1225	350	--	--	--	514	11	23	--	--	--
25...	1230	460	13.0	3.00	4.87	232	--	71	82	98	100
25...	1234	460	--	6.50	4.17	247	--	63	74	100	--
25...	1238	460	--	9.30	3.57	324	--	51	60	94	100
25...	1242	460	--	10.8	3.28	311	--	50	60	95	100
25...	1246	460	--	11.7	3.23	394	--	41	52	90	100
25...	1250	460	--	12.2	3.18	337	--	50	59	92	100
25...	1255	460	--	--	--	261	--	61	69	92	100
25...	1315	615	17.0	3.90	3.94	152	--	85	97	99	100
25...	1319	615	--	8.50	3.46	173	--	95	99	100	--
25...	1323	615	--	12.1	3.20	141	--	95	99	100	--
25...	1327	615	--	14.2	2.89	169	--	92	98	100	--
25...	1331	615	--	15.3	2.61	167	--	92	97	100	--
25...	1333	615	--	16.0	2.53	178	--	86	94	98	100
25...	1335	615	--	--	--	168	--	94	99	100	--

06807000 MISSOURI RIVER AT NEBRASKA CITY, NE--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK) (00009)	DEPTH AT SAMPLE LOC-ATION, TOTAL (FEET) (81903)	SAM-PLING DEPTH (FEET) (00003)	STREAM VELOC-ITY, POINT (FPS) (81904)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)
SEP											
12...	WATER TEMPERATURE, 18.0° C (1115-1355); DISCHARGE, 38,700 ft^3/s.										
12...	1115	150	18.0	4.20	4.91	397	--	91	97	100	--
12...	1119	150	--	9.00	4.91	438	--	86	96	100	--
12...	1123	150	--	12.9	4.70	493	--	80	88	97	100
12...	1127	150	--	15.0	3.94	475	--	80	88	99	100
12...	1131	150	--	16.2	3.50	511	--	74	82	96	100
12...	1135	150	--	17.0	3.28	625	--	63	73	93	100
12...	1140	150	--	--	--	444	--	84	92	98	100
12...	1150	240	16.4	3.80	4.91	581	--	70	79	98	100
12...	1154	240	--	8.20	4.59	686	--	62	73	98	100
12...	1158	240	--	11.7	4.37	659	--	63	74	98	100
12...	1202	240	--	13.7	3.83	751	--	56	68	95	100
12...	1206	240	--	14.8	3.83	787	--	54	64	95	100
12...	1210	240	--	15.4	3.83	807	--	51	61	94	100
12...	1215	240	--	--	--	636	--	63	74	97	100
12...	1219	360	--	7.20	5.24	230	--	--	--	--	--
12...	1220	360	--	--	--	882	26	52	--	--	--
12...	1225	360	14.4	3.30	5.45	--	--	--	--	--	--
12...	1234	360	--	10.3	4.91	--	--	--	--	--	--
12...	1238	360	--	12.0	4.48	--	--	--	--	--	--
12...	1242	360	--	13.0	4.04	--	--	--	--	--	--
12...	1248	360	--	13.6	3.72	--	--	--	--	--	--
12...	1250	360	--	--	--	682	--	64	71	95	100
12...	1300	470	13.6	3.10	5.02	574	--	81	85	100	--
12...	1303	470	--	6.80	4.48	590	--	77	82	100	--
12...	1306	470	--	9.70	4.15	778	--	60	66	99	100
12...	1309	470	--	11.3	4.04	887	--	53	58	96	100
12...	1312	470	--	12.2	2.96	1110	--	44	49	92	100
12...	1315	470	--	12.8	2.85	717	--	66	72	98	100
12...	1320	470	--	--	--	822	--	55	60	97	100
12...	1330	600	14.2	3.30	4.15	471	--	94	98	99	100
12...	1334	600	--	7.10	3.83	511	--	92	96	99	100
12...	1338	600	--	10.1	3.61	488	--	94	98	100	--
12...	1342	600	--	11.3	3.09	494	--	93	97	100	--
12...	1346	600	--	12.8	2.74	493	--	91	95	100	--
12...	1350	600	--	13.4	2.63	517	--	88	92	99	100
12...	1355	600	--	--	--	475	--	93	97	99	100

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAM-PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)
OCT										
03...	1215	5	0	2	27	55	73	89	97	100
MAY										
02...	1400	5	0	1	21	57	77	89	97	100
JUN										
13...	1400	5	--	0	24	54	78	92	98	100
JUL										
25...	1400	5	--	0	14	46	68	86	96	100
SEP										
12...	1425	5	--	0	12	45	72	88	97	100

06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IA

LOCATION.--Lat 41°23'24",long 95°22'17",in NW1/4 NE1/4 sec.18, T.76 N., R.39 W., Pottawattamie County, Hydrologic Unit 10240002, on right bank at upstream side of bridge on county highway G30, 0.6 mi west of Hancock school, 3.0 mi downstream from Jim Creek, 59.6 mi upstream from confluence with East Nishnabotna River, and at mile 75.1 mi upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--609 mi^2.

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage encoder. Datum of gage is 1,085.83 ft above NGVD. Prior to Sept. 15, 1980, on downstream end of right pier at same datum.

REMARKS.--Estimated daily discharges: Nov. 28 to Jan. 29, Feb. 2 to Mar. 9, 19-21, and May 28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--30 years, 295 ft^3/s, 6.58 in/yr, 213,700 acre-ft/yr; median of yearly mean discharges, 240 ft^3/s, 5.4 in/yr, 174,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,400 ft^3/s Sept. 13, 1972, gage height, 22.12 ft; minimum daily discharge, 2.2 ft^3/s Feb. 8, 9, 1971.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 26	1600	5,270	9.95	Sept. 8	2315	*17,600	*19.44

Minimum daily discharge, 30 ft^3/s Feb.5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	132	52	54	60	208	57	73	54	91	204	112	55
2	99	52	58	47	80	57	72	53	72	226	84	50
3	86	53	64	43	45	58	71	51	715	163	76	47
4	76	54	54	47	40	66	67	49	345	142	71	1150
5	72	51	46	50	30	60	66	48	107	130	66	455
6	69	50	60	52	38	58	65	46	78	122	58	205
7	68	51	54	65	45	80	64	46	160	116	59	515
8	66	50	45	56	60	150	64	45	567	111	55	11700
9	64	50	33	50	47	1500	63	43	174	107	53	5830
10	62	50	43	55	40	1990	60	42	87	100	50	1320
11	59	51	38	64	45	661	60	42	74	94	45	851
12	57	63	36	60	50	327	60	42	69	93	44	654
13	58	72	42	52	60	205	59	40	79	89	44	557
14	57	67	50	42	53	156	58	39	58	87	43	473
15	56	63	40	44	50	129	57	39	52	90	89	413
16	56	73	34	45	45	119	58	39	49	93	65	372
17	53	78	37	47	44	103	58	38	46	90	53	338
18	52	73	42	50	45	82	60	46	51	471	48	307
19	52	74	50	54	48	70	61	91	49	153	52	282
20	54	74	56	56	50	80	58	96	43	103	56	262
21	55	65	45	43	54	86	56	54	39	79	50	250
22	54	64	40	45	58	93	55	45	1040	74	48	237
23	51	72	60	50	50	90	54	42	722	72	77	218
24	49	70	50	54	40	88	53	40	198	70	65	210
25	49	70	45	58	53	83	51	62	1560	68	49	209
26	49	73	40	55	80	82	49	51	2520	58	65	201
27	49	70	50	50	64	83	48	40	960	56	603	195
28	48	45	45	60	58	84	57	39	405	54	153	191
29	48	60	47	78	---	79	71	812	294	333	94	188
30	48	68	52	987	---	77	58	564	238	888	73	183
31	50	---	58	369	---	76	---	139	---	168	62	---
TOTAL	1898	1858	1468	2888	1580	6929	1806	2877	10942	4704	2562	27918
MEAN	61.2	61.9	47.4	93.2	56.4	224	60.2	92.8	365	152	82.6	931
MAX	132	78	64	987	208	1990	73	812	2520	888	603	11700
MIN	48	45	33	42	30	57	48	38	39	54	43	47
AC-FT	3760	3690	2910	5730	3130	13740	3580	5710	21700	9330	5080	55380
CFSM	.10	.10	.08	.15	.09	.37	.10	.15	.60	.25	.14	1.53
IN.	.12	.11	.09	.18	.10	.42	.11	.18	.67	.29	.16	1.71

CAL YR 1988 TOTAL 46113 MEAN 126 MAX 1120 MIN 33 AC-FT 91470 CFSM .21 IN. 2.82
WTR YR 1989 TOTAL 67430 MEAN 185 MAX 11700 MIN 30 AC-FT 133700 CFSM .30 IN. 4.12

06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IA

LOCATION.--Lat 40°52'23", long 95°34'48", in NE1/4 NE1/4 sec.17, T.70 N., R.41 W., Fremont County, Hydrologic Unit 10240002, on right bank at upstream side of bridge on State Highway 184, 0.3 mi downstream from Deer Creek, 0.5 mi west of Randolph, and 16.0 mi upstream from confluence with East Nishnabotna River, and at mile 31.5 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--1,326 mi^2.

PERIOD OF RECORD.--June 1948 to current year.

REVISED RECORDS.--WSP 1440: Drainage area. WDR IA-74-1: 1973 (M). WDR IA-76-1: 1975 (P).

GAGE.--Water-stage recorder. Datum of gage is 932.99 ft above NGVD, unadjusted. Prior to Aug. 26, 1955, nonrecording gage with supplementary water-stage recorder operating above 8.4 ft June 30, 1949 to Aug. 25, 1955 at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 28, 29, Dec. 1, 2, 4, 5, Dec. 7 to Jan. 29, Feb. 2 to Mar. 9, Mar. 19, 20, and Aug. 3, 6, 12, 13, 22-26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--41 years, 589 ft^3/s, 6.03 in/yr, 426,700 acre-ft/yr; median of yearly mean discharges, 500 ft^3/s, 5.1 in/yr, 362,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,800 ft^3/s May 26, 1987, gage height, 24.50 ft, from rating curve extended above 35,800 ft^3/s; maximum gage height, 24.8 ft Mar. 5, 1949, from graph based on gage readings, backwater from ice; minimum daily discharge, 10 ft^3/s Dec. 17-21, 1955.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of about 24 ft, discharge not determined, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 25	0915	6,930	15.94	Sept. 9	0100	*21,300	*22.92

Minimum daily discharge, 46 ft^3/s Feb. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	439	106	136	118	446	115	160	139	233	343	381	161
2	225	109	132	96	170	115	157	126	165	325	219	139
3	169	111	146	85	90	119	153	122	200	304	166	157
4	145	113	140	95	60	132	148	117	985	249	153	1400
5	133	113	135	100	46	121	144	113	468	222	139	2380
6	128	113	142	110	54	118	141	111	210	206	126	619
7	124	113	138	130	66	125	142	106	158	197	120	465
8	118	112	122	110	75	145	143	100	2100	185	115	10200
9	116	113	66	100	60	500	138	97	809	174	109	16200
10	114	113	82	110	56	4550	133	93	334	165	108	4260
11	109	113	78	130	61	1720	132	88	213	163	101	2160
12	107	131	74	115	66	841	128	86	179	164	92	1610
13	105	139	96	100	74	506	126	84	222	158	86	1310
14	103	138	90	90	70	347	124	83	171	148	80	1100
15	102	160	80	92	64	282	119	79	158	217	83	955
16	102	212	69	95	58	243	117	86	137	204	120	854
17	99	182	78	100	60	222	116	87	137	169	113	781
18	96	170	90	105	63	191	122	99	131	422	89	718
19	96	163	100	109	64	173	127	138	123	701	92	665
20	106	160	110	110	68	181	128	169	130	288	93	612
21	106	154	95	97	72	186	120	171	124	199	111	571
22	106	154	84	87	75	175	116	131	852	168	160	525
23	106	145	115	97	66	168	113	106	1950	149	95	484
24	103	149	105	110	60	165	112	97	1030	146	90	451
25	99	148	96	115	80	155	108	93	4380	136	126	434
26	98	156	85	110	150	152	105	90	2610	129	118	426
27	99	159	98	100	130	150	109	117	2830	124	483	408
28	101	132	88	113	120	143	509	95	997	115	837	387
29	103	138	94	150	---	139	140	131	534	109	399	373
30	105	139	100	440	---	143	130	888	394	497	270	359
31	106	---	113	990	---	153	---	575	---	1290	204	---
TOTAL	3868	4158	3177	4509	2524	12475	4260	4617	22964	8066	5478	51164
MEAN	125	139	102	145	90.1	402	142	149	765	260	177	1705
MAX	439	212	146	990	446	4550	509	888	4380	1290	837	16200
MIN	96	106	66	85	46	115	105	79	123	109	80	139
AC-FT	7670	8250	6300	8940	5010	24740	8450	9160	45550	16000	10870	101500
CFSM	.09	.10	.08	.11	.07	.30	.11	.11	.58	.20	.13	1.29
IN.	.11	.12	.09	.13	.07	.35	.12	.13	.64	.23	.15	1.44

CAL YR 1988 TOTAL 99589 MEAN 272 MAX 1460 MIN 66 AC-FT 197500 CFSM .21 IN. 2.79
WTR YR 1989 TOTAL 127260 MEAN 349 MAX 16200 MIN 46 AC-FT 252400 CFSM .26 IN. 3.57

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IA

LOCATION.--Lat 41°20'46", long 95°04'36", in NW1/4 NW1/4 sec.35, T.76 N., R.37 W., Cass County, Hydrologic Unit 10240003, on left bank at downstream side of bridge on county highway, 1.6 mi upstream from Turkey Creek, 5.2 mi southwest of junction of U.S. Highway 6 and State Highway 83 in Atlantic, 69.1 mi upstream from confluence with West Nishnabotna River, and at mile 84.6 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--436 mi^2.

PERIOD OF RECORD.--October 1960 to current year.

GAGE.--Water-stage encoder. Datum of gage is 1,105.83 ft above NGVD. Prior to Oct. 1, 1970, at site 2.2 mi upstream at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 22, 23, Nov. 26 to Jan. 30, Feb. 2 to Mar. 9, Mar. 19, 20, May 30, 31, June 2-4,12,and July 27,28. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--29 years, 223 ft^3/s, 6.95 in/yr, 161,600 acre-ft/yr; median of yearly mean discharges, 220 ft^3/s, 6.9 in/yr, 159,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,700 ft^3/s Sept. 12, 1972, gage height, 22.81 ft; minimum daily discharge, 2.5 ft^3/s July 10, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 2, 1958 reached a stage of 22.49 ft, from floodmark, discharge, 34,200 ft ^{3}/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 8	1645	*18,800	*17.95	No other peak above base discharge.			

Minimum discharge, 12 ft^3/s June 21, 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	25	30	27	154	25	36	37	33	131	106	22
2	44	26	27	22	50	24	35	36	31	116	82	19
3	38	26	35	19	25	25	34	33	31	101	69	20
4	34	30	32	20	20	30	31	34	29	89	66	299
5	33	29	29	22	15	27	32	30	60	78	57	396
6	31	29	35	25	19	25	30	30	45	67	56	132
7	28	31	30	30	22	30	34	26	38	62	48	153
8	29	29	26	25	25	60	32	24	308	58	40	13100
9	31	28	18	22	22	1100	31	24	164	51	33	5090
10	27	27	22	25	18	1050	28	22	84	44	26	1270
11	25	30	21	29	20	451	29	20	69	44	24	695
12	24	47	19	26	23	238	28	21	52	47	23	485
13	22	48	21	23	25	154	28	22	78	40	21	400
14	21	45	25	19	23	120	27	20	43	32	25	340
15	22	70	18	20	21	96	27	20	35	47	26	296
16	21	146	15	21	20	91	26	19	33	43	21	266
17	21	111	17	22	20	70	26	21	32	33	18	241
18	20	76	19	23	20	55	31	26	27	243	17	220
19	22	55	22	24	21	45	37	27	16	151	23	198
20	26	49	25	26	22	56	29	29	13	80	21	180
21	26	41	21	20	22	46	26	28	13	55	18	165
22	24	36	18	19	23	61	27	24	453	45	16	153
23	25	43	27	22	20	64	26	22	342	45	48	142
24	22	42	24	25	18	63	25	21	172	42	129	137
25	23	40	21	26	24	60	27	22	407	47	47	134
26	23	40	19	25	35	52	25	28	1040	30	64	129
27	24	30	23	22	28	50	23	21	758	29	152	123
28	23	23	19	25	26	53	47	31	255	29	123	119
29	23	30	21	30	---	48	65	342	180	82	53	114
30	26	35	23	350	---	41	38	105	142	667	33	110
31	26	---	25	286	---	40	---	47	---	170	27	---
TOTAL	848	1317	727	1320	781	4350	940	1212	4983	2798	1512	25148
MEAN	27.4	43.9	23.5	42.6	27.9	140	31.3	39.1	166	90.3	48.8	838
MAX	64	146	35	350	154	1100	65	342	1040	667	152	13100
MIN	20	23	15	19	15	24	23	19	13	29	16	19
AC-FT	1680	2610	1440	2620	1550	8630	1860	2400	9880	5550	3000	49880
CFSM	.06	.10	.05	.10	.06	.32	.07	.09	.38	.21	.11	1.92
IN.	.07	.11	.06	.11	.07	.37	.08	.10	.43	.24	.13	2.15

CAL YR 1988 TOTAL 25501 MEAN 69.7 MAX 752 MIN 15 AC-FT 50580 CFSM .16 IN. 2.18
WTR YR 1989 TOTAL 45936 MEAN 126 MAX 13100 MIN 13 AC-FT 91110 CFSM .29 IN. 3.92

06809500 EAST NISHNABOTNA RIVER AT RED OAK, IA

LOCATION.--Lat 41°00'31", long 95°14'29", in NW1/4 SE1/4 sec.29, T.72 N., R.38 W., Montgomery County, Hydrologic Unit 10240003, on upstream side of Coolbaugh Street and 200 ft left of left end of Coolbaugh Street bridge in Red Oak, and 0.2 mi upstream from Red Oak Creek, 38.0 mi upstream from confluence with West Nishnabotna River, and at mile 53.6 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.--894 mi^2.

PERIOD OF RECORD.--May 1918 to July 1925, May 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1921, 1922-23 (M), 1924, 1942 (M), 1944 (M), 1946. WSP 1440: Drainage area. WSP 1710: 1957.

GAGE.--Water-stage recorder. Datum of gage is 1,005.45 ft above NGVD. Prior to July 5, 1925, nonrecording gage at present site at datum 4.60 ft higher. May 29, 1936, to Nov. 13, 1952, nonrecording gage with supplementary water-stage recorder in operation above 3.2 ft gage height July 30, 1939, to Nov. 13, 1952, and Nov. 14, 1952, to June 13, 1966, water-stage recorder, all at site 0.5 mi upstream at datum 5.00 ft higher. June 14, 1966, to Sept. 30, 1969, at present site at datum 5.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 28 to Jan. 28 and Feb. 2 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--59 years (water years 1919-24, 1937-89), 395 ft^3/s, 6.00 in/yr, 286,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,000 ft^3/s Sept. 13, 1972, gage height, 27.43 ft; maximum gage height, 28.23 ft June 13, 1947, present datum; minimum daily discharge, 6 ft^3/s Aug. 18, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
March 10	0355	4,820	12.70	Sept. 9	1430	*22,100	*21.74

Minimum discharge, 34 ft^3/s Dec. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	110	52	70	76	230	90	93	74	96	240	252	99
2	83	54	64	60	110	89	90	68	80	237	163	93
3	65	54	71	46	47	90	87	65	88	179	131	97
4	58	56	70	50	39	110	84	64	147	154	118	384
5	54	56	68	60	38	98	79	64	171	137	109	1280
6	53	54	74	68	43	94	78	61	99	124	100	432
7	52	54	76	74	50	100	79	60	80	114	95	236
8	54	54	60	66	60	118	78	57	350	106	91	11000
9	54	54	43	58	50	400	75	54	472	101	87	19700
10	53	55	60	66	48	3170	73	54	204	98	83	5360
11	50	55	56	70	52	1290	70	53	130	96	79	2400
12	49	63	52	72	58	609	68	52	110	101	77	1550
13	50	70	59	56	68	374	65	51	98	103	74	1130
14	49	72	70	54	62	268	64	51	103	95	72	920
15	49	147	60	59	58	216	62	52	89	104	75	785
16	50	261	43	62	56	181	61	53	84	114	93	680
17	50	285	45	64	56	168	60	59	80	101	74	605
18	48	149	54	66	58	116	61	60	85	238	67	540
19	48	116	66	72	60	138	65	61	84	661	71	487
20	52	98	77	80	64	140	68	67	77	234	73	440
21	54	90	64	60	68	130	63	62	71	140	75	405
22	54	84	52	62	70	119	60	59	2030	117	70	378
23	55	86	84	64	60	125	58	56	1630	104	64	350
24	54	84	70	70	50	117	58	56	679	95	90	328
25	53	83	58	74	60	109	57	54	2720	88	143	323
26	52	83	48	70	120	106	55	52	1550	85	101	317
27	51	83	64	66	100	104	61	55	2120	75	167	296
28	51	69	48	76	94	102	97	58	741	75	304	280
29	51	66	54	199	---	104	69	186	408	74	206	269
30	50	74	61	758	---	102	74	348	306	586	142	255
31	51	---	74	490	---	97	---	144	---	898	112	---
TOTAL	1707	2661	1915	3268	1929	9074	2112	2310	14982	5674	3458	51419
MEAN	55.1	88.7	61.8	105	68.9	293	70.4	74.5	499	183	112	1714
MAX	110	285	84	758	230	3170	97	348	2720	898	304	19700
MIN	48	52	43	46	38	89	55	51	71	74	64	93
AC-FT	3390	5280	3800	6480	3830	18000	4190	4580	29720	11250	6860	102000
CFSM	.06	.10	.07	.12	.08	.33	.08	.08	.56	.20	.12	1.92
IN.	.07	.11	.08	.14	.08	.38	.09	.10	.62	.24	.14	2.14

CAL YR 1988 TOTAL 49085 MEAN 134 MAX 1000 MIN 42 AC-FT 97360 CFSM .15 IN. 2.04
WTR YR 1989 TOTAL 100509 MEAN 275 MAX 19700 MIN 38 AC-FT 199400 CFSM .31 IN. 4.18

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA
(National stream-quality accounting network station)

LOCATION.--Lat 40°37'57", long 95°37'32", in SW1/4 SE1/4 sec.11, T.67 N., R.42 W., Fremont County, Hydrologic Unit 10240004, on left bank 1.7 mi downstream from confluence of East Nishnabotna and West Nishnabotna Rivers, 2 mi northeast of Hamburg, and at mile 13.8.

DRAINAGE AREA.--2,806 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1922 to September 1923, October 1928 to current year. Monthly discharge only for some periods published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1923, 1929-37, 1938-40 (M), 1943 (M). WSP 1440: Drainage area. WDR IA-74-1: 1973.

GAGE.--Water-stage encoder. Datum of gage is 894.17 ft above NGVD. See WSP 1730 for history of changes prior to Nov. 16, 1950.

REMARKS.--Estimated daily discharges: Dec. 10 to Jan. 25, Feb. 2 to March 9, March 18 - 20, and Sept. 19. Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE--62 years (water years 1923, 1929-89), 1,118 ft^3/s, 5.41 in/yr, 810,000 acre-ft/yr; median of yearly mean discharges, 940 ft^3/s, 4.5 in/yr, 681,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,500 ft^3/s June 24, 1947, gage height, 26.03 ft, from floodmark, present site and datum; maximum gage height, 28.27 ft Sept. 10, 1989; minimum daily discharge, 4.5 ft^3/s Aug. 30, 1934.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar 10	1115	12,000	21.22	Sept. 10	0315	*32,900	*28.27
June 25	1715	12,900	21.65				

Minimum discharge, 128 ft^3/s Aug. 24, 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV.	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	427	164	237	280	1110	260	303	270	450	810	1240	243
2	376	161	240	230	350	255	301	264	302	738	534	204
3	270	170	232	180	170	270	292	241	271	781	380	200
4	203	181	230	190	120	300	279	243	678	587	315	641
5	177	193	232	220	110	280	269	230	746	498	281	3300
6	166	193	231	240	125	270	264	220	431	449	247	1890
7	154	196	223	270	150	300	264	209	290	405	224	1070
8	158	194	213	230	170	350	266	203	1520	371	207	14400
9	156	196	180	210	130	600	257	189	1630	346	199	29900
10	166	198	150	250	120	7580	245	182	875	326	188	21500
11	154	196	170	270	135	3980	242	176	480	309	180	14600
12	144	214	175	280	150	2170	240	171	340	304	173	9200
13	145	235	220	230	170	1280	235	166	319	297	167	6480
14	148	238	240	200	160	861	235	163	267	288	160	4470
15	147	413	190	210	150	653	233	160	258	385	149	3580
16	154	893	160	210	135	549	231	154	224	482	163	2910
17	148	589	180	215	140	471	225	152	204	343	193	2520
18	134	530	200	220	145	370	224	154	212	644	160	2220
19	135	391	220	225	150	320	227	180	207	1210	152	2030
20	151	332	250	230	155	350	232	215	193	977	151	1820
21	161	300	220	210	165	351	235	234	177	510	140	1640
22	161	285	200	200	170	369	226	230	3210	375	697	1470
23	181	273	250	220	155	347	216	183	4870	329	221	1320
24	165	264	230	250	145	347	216	163	2700	307	140	1210
25	161	265	210	270	190	340	207	150	9060	277	149	1100
26	164	272	180	256	350	335	202	139	6060	256	228	1060
27	163	278	210	240	310	330	196	148	4430	243	521	1010
28	160	256	180	279	260	329	583	152	3020	231	989	944
29	160	250	200	430	---	321	402	157	1520	219	847	875
30	160	242	240	613	---	322	258	451	1020	221	441	835
31	162	---	270	1560	---	310	---	1120	---	1840	314	---
TOTAL	5511	8562	6563	9118	5790	25170	7805	7069	45964	15358	10150	134642
MEAN	178	285	212	294	207	812	260	228	1532	495	327	4488
MAX	427	893	270	1560	1110	7580	583	1120	9060	1840	1240	29900
MIN	134	161	150	180	110	255	196	139	177	219	140	200
AC-FT	10930	16980	13020	18090	11480	49920	15480	14020	91170	30460	20130	267100
CFSM	.06	.10	.08	.10	.07	.29	.09	.08	.55	.18	.12	1.60
IN.	.07	.11	.09	.12	.08	.33	.10	.09	.61	.20	.13	1.78

CAL YR 1988 TOTAL 188695 MEAN 516 MAX 2650 MIN 106 AC-FT 374300 CFSM .18 IN. 2.50
WTR YR 1989 TOTAL 281702 MEAN 772 MAX 29900 MIN 110 AC-FT 558800 CFSM .28 IN. 3.73

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1979 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 1979 to September 1981.
WATER TEMPERATURES: April 1979 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 815 microsiemens Sept. 16,18, 19, 28,30, 1979; minimum daily, 155 microsiemens, July 20, 1981.
WATER TEMPERATURES: Maximum daily, 32.0°C July 14, 1980; minimum daily 0.0°C, on many days during winter period.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	TEMPERATURE AIR (DEG C) (00020)	TURBIDITY (NTU) (00076)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	BAROMETRIC PRESSURE (MM OF HG) (00025)	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT 28...	1130	154	540	8.40	5.0	7.5	3.7	12.4	99	747	67	190
DEC 13...	1230	225	650	8.20	0.0	10.5	6.6	12.8	91	736	100	350
MAR 14...	1230	871	308	8.40	6.0	5.0	300	11.5	97	723	1100	13000
MAY 11...	1130	171	560	8.60	17.0	18.0	16	10.7	114	743	75	110
JUN 29...	1345	1420	290	8.10	28.0	31.0	1200	6.1	80	740	45000	19000
AUG 25...	1100	145	432	8.20	25.0	26.0	18	9.3	117	735	2800	1900

DATE	HARDNESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CARBONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICARBONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DISSOLVED (MG/L AS SO4) (00945)
OCT 28...	40	270	68	25	15	10	0.4	4.4	240	7	278	48
DEC 13...	49	320	85	27	18	11	0.5	4.0	283	0	345	54
MAR 14...	22	130	36	10	7.7	10	0.3	10	119	3	139	30
MAY 11...	36	270	68	24	16	11	0.4	4.4	228	8	261	44
JUN 29...	15	97	27	7.1	14	23	0.6	5.9	90	0	109	17
AUG 25...	37	210	55	18	13	11	0.4	5.0	150	0	183	41

DATE	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)
OCT 28...	15	0.30	8.5	332	327	0.45	138	0.40	0.440	0.020	0.040	0.200
DEC 13...	17	0.30	14	390	396	0.53	237	0.45	2.60	0.030	0.390	0.350
MAR 14...	10	0.30	10	210	192	0.29	494	1.9	2.30	0.050	1.10	1.10
MAY 11...	15	0.40	6.4	312	320	0.42	144	0.67	0.240	0.010	0.030	0.030
JUN 29...	6.2	0.40	9.8	152	154	0.21	583	1.5	3.80	0.040	0.160	0.220
AUG 25...	13	0.30	4.1	252	255	0.34	98.7	0.67	<0.100	<0.010	0.040	0.030

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IA--Continued

WATER-QUALITY RECORDS

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P) (00671)	PHOSPHOROUS DISSOLVED (MG/L AS P) (00666)	PHOSPHOROUS TOTAL (MG/L AS P) (00665)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)
OCT 28...	0.60	0.070	0.090	0.090	16	6.7	92	2	<10	140	<0.5	2
DEC 13...	0.80	0.080	0.100	0.130	58	35	80	--	--	--	--	--
MAR 14...	3.0	0.070	0.180	0.580	710	1670	99	2	80	130	<0.5	<1
MAY 11...	0.70	0.050	0.040	0.210	71	33	100	3	<10	150	<0.5	<1
JUN 29...	1.7	0.120	0.130	0.460	3840	14700	99	--	--	--	--	--
AUG 25...	0.70	0.080	0.100	0.200	50	20	99	3	<10	160	<0.5	<1

DATE	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)
OCT 28...	<1	<3	1	20	<5	11	79	0.2	<10	4	2
DEC 13...	--	--	--	--	--	--	--	--	--	--	--
MAR 14...	<1	<3	6	85	<5	<4	25	<0.1	<10	11	2
MAY 11...	<1	<3	3	17	<1	13	50	<0.1	<10	24	2
JUN 29...	--	--	--	--	--	--	--	--	--	--	--
AUG 25...	<1	<3	13	3	21	11	22	0.1	<10	3	1

[Pesticide concentration expressed as total recoverable]

DATE	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	ATRAZINE, TOTAL (UG/L) (39630)	CYANAZINE TOTAL (UG/L) (81757)	METRIBUZIN IN WHOLE WATER (UG/L) (81408)	ALACHLOR TOTAL RECOVER (UG/L) (77825)	METOLACHLOR IN WHOLE WATER (UG/L) (39356)	TRIFLURALIN TOTAL RECOVER (UG/L) (39030)	BUTYLATE (UG/L) (99901)
OCT 28...	<1.0	250	<6	7	--	--	--	--	--	--	--
DEC 13...	--	--	--	--	--	--	--	--	--	--	--
MAR 14...	<1.0	130	<6	5	--	--	--	--	--	--	--
MAY 11...	<1.0	260	<6	7	0.69	1.6	0.29	<0.10	<0.10	<0.10	--
JUN 29...	--	--	--	--	5.0	2.0	3.70	0.30	<0.10	<0.10	<0.10
AUG 25...	<1.0	220	<6	31	--	--	--	--	--	--	--

06811840 TARKIO RIVER AT STANTON, IA

LOCATION.--Lat 40°58'52", long 95°06'32", in NW1/4 SW1/4 sec.4, T.71 N., R.37 W., Montgomery County, Hydrologic Unit 10240005, on right bank 10 ft downstream from bridge on county highway H42, 0.1 mi downstream from Little Tarkio Creek, and 0.5 mi west of Stanton.

DRAINAGE AREA.--49.3 mi^2.

PERIOD OF RECORD.--October 1957 to current year. Annual maximum, water years 1952-57.

REVISED RECORDS.--WSP 1919: 1960 (M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,104.67 ft above NGVD.

REMARKS.--Estimated daily discharges: Oct. 1 to Nov. 14, Nov. 18 to Jan. 21, Jan. 25, 26, Feb. 2-15, 22-24, and April 2-18, 21-26. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--32 years, 28.9 ft^3/s, 7.96 in/yr, 20,940 acre-ft/yr; median of yearly mean discharges, 25 ft^3/s, 6.9 in/yr, 18,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,500 ft^3/s June 9, 1967, gage height, 28.56 ft, from rating curve extended above 1,600 ft^3/s on basis of slope-area measurement of peak flow; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
June 22	0815	4,990	16.36	Sept. 8	0907	4,000	15.59
June 24	1700	1,640	13.13	Sept. 8	2121	2,410	14.13
June 25	0330	*6,090	*16.98				

No flow Oct. 3-5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.20	.17	.62	.83	3.5	1.2	.87	3.6	.47	12	1.1	.24
2	.01	.15	.58	.52	1.3	1.1	.82	3.8	.42	11	.35	.08
3	.00	.14	.64	.41	.37	1.5	.76	2.5	.60	10	.28	2.0
4	.00	.18	.62	.65	.34	4.6	.84	3.4	.72	9.3	.24	12
5	.00	.17	.60	.86	.35	2.8	.78	2.7	.57	8.4	.19	5.1
6	.01	.16	.64	.82	.38	1.2	.74	1.4	.57	7.8	.10	1.9
7	.01	.18	.66	.78	.44	1.2	.70	.92	.61	7.3	.09	32
8	.01	.21	.58	.65	.51	86	.79	.91	1.9	7.3	.08	1390
9	.01	.20	.45	.52	.45	509	.74	.92	1.0	6.8	.08	336
10	.02	.21	.58	.57	.43	296	.68	.68	.64	6.7	.09	31
11	.02	.21	.38	.66	.64	130	.64	.63	.79	6.5	.10	18
12	.02	.24	.41	.74	.57	88	.60	.63	1.0	6.5	.08	13
13	.02	.35	.48	.50	.52	19	.56	.67	.92	6.5	.07	11
14	.03	.28	.59	.61	.47	5.2	.54	.59	.82	6.0	.07	9.0
15	.02	31	.47	.74	.52	3.8	.51	.62	.78	8.4	.07	7.6
16	.02	43	.36	.56	.56	3.1	.49	.87	.66	7.6	.07	7.0
17	.03	5.0	.40	.68	.60	2.0	.48	.72	.69	6.7	.06	6.7
18	.05	2.5	.47	.78	.63	1.4	.48	.87	1.1	9.0	.06	6.4
19	.04	1.5	.57	.70	.68	1.8	.61	.89	1.3	7.1	.07	6.2
20	.04	1.2	.66	.62	.71	2.7	.65	.72	1.3	6.0	.06	6.0
21	.06	1.1	.35	.58	.76	1.3	.60	.62	1.3	4.7	.06	5.9
22	.16	1.0	.52	.62	.64	1.5	.56	.62	936	3.0	.06	5.8
23	.15	.88	.74	.63	.58	1.7	.53	.62	26	3.2	.07	5.7
24	.14	.80	.62	.59	.65	1.4	.52	.68	239	2.8	.07	5.7
25	.13	.74	.52	.57	.88	1.3	.48	.48	1110	2.3	.08	5.6
26	.12	.70	.45	.56	1.3	1.2	.45	.41	37	1.9	.37	5.6
27	.11	.66	.60	.62	1.8	1.3	.88	.35	20	1.2	6.6	5.6
28	.12	.64	.40	6.6	1.6	1.1	260	.36	16	.61	5.5	5.5
29	.11	.58	.43	158	---	1.0	26	.76	14	.50	5.3	5.5
30	.10	.64	.60	17	---	1.0	3.6	.58	14	2.4	1.6	5.6
31	.13	---	.78	5.2	---	.95	---	.49	---	3.1	.26	---
TOTAL	1.89	94.79	16.77	204.17	22.18	1175.35	306.90	34.01	2430.16	182.61	23.28	1957.72
MEAN	.061	3.16	.54	6.59	.79	37.9	10.2	1.10	81.0	5.89	.75	65.3
MAX	.20	43	.78	158	3.5	509	260	3.8	1110	12	6.6	1390
MIN	.00	.14	.35	.41	.34	.95	.45	.35	.42	.50	.06	.08
AC-FT	3.7	188	33	405	44	2330	609	67	4820	362	46	3880
CFSM	.00	.06	.01	.13	.02	.77	.21	.02	1.64	.12	.02	1.32
IN.	.00	.07	.01	.15	.02	.89	.23	.03	1.83	.14	.02	1.48

CAL YR 1988 TOTAL 1761.21 MEAN 4.81 MAX 52 MIN .00 AC-FT 3490 CFSM .10 IN. 1.33
WTR YR 1989 TOTAL 6449.83 MEAN 17.7 MAX 1390 MIN .00 AC-FT 12790 CFSM .36 IN. 4.87

06813500 MISSOURI RIVER AT RULO, NE

LOCATION.--Lat 40°03'13", long 95°25'19", in NW1/4 NW1/4 sec.17, T.1 N., R.18 E., Richardson County, Hydrologic Unit 10240005, on right bank at downstream side of bridge on U.S. Highway 159 at Rulo, 3.2 mi upstream from Big Nemaha River, and at mile 498.0.

DRAINAGE AREA.--414,900 mi^2, approximately. The 3,959 mi^2 in Great Divide basin are not included.

PERIOD OF RECORD.--October 1949 to current year in reports of U.S. Geological Survey. Gage-height record collected at site 80 ft upstream January 1886 to December 1899 published in reports of Missouri River Commission September 1929 to September 1950 in files of Kansas City office of U.S. Army Corps of Engineers.

GAGE.--Water-stage encoder. Datum of gage is 837.23 ft above NGVD Oct. 1949 to Sept. 12, 1950, nonrecording gage at site 80 ft upstream and Sept. 13, 1950 to Apr. 19, 1983, recording gage on downstream end of middle pier pier, all at same datum.

REMARKS.--Estimated daily discharges: Aug. 5 - 7. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--40 years, 41,430 ft^3/s, 30,020,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 358,000 ft^3/s Apr. 22, 1952, gage height, 25.60 ft; minimum daily discharge, 4,420 ft^3/s Jan. 13, 1957; minimum gage height, 0.65 ft Jan. 7, 1971, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1881 reached a stage of 22.9 ft, from floodmark, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 118,000 ft^3/s Sept. 9, gage height, 20.94 ft; minimum daily discharge, 8,190 ft^3/s Feb. 7; minimum gage height 0.78 ft Feb. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47800	37500	19700	15300	26100	24200	38200	37300	37000	43200	41100	34100
2	41900	37000	20400	16000	26800	23300	38500	37100	34600	41300	37200	33500
3	40600	37500	21200	17400	23100	22800	37000	36800	37400	41000	36300	33300
4	39800	37600	20600	18200	15500	22900	35600	36500	37400	42000	36100	41700
5	39100	38200	20400	17700	12100	22000	35900	36200	36400	41200	35400	55200
6	39300	38400	21000	18200	8980	18900	35400	36000	35500	39700	34900	50500
7	39000	38500	20600	21100	8190	17300	35500	36200	35700	38500	35600	47000
8	38800	38600	20500	25600	13600	18500	35900	35900	35600	38500	34800	53800
9	39000	38700	20400	25200	21400	21900	35900	35900	38100	36200	34600	114000
10	38800	38200	21000	20000	21400	31000	36200	35300	38600	35400	34500	106000
11	39100	36100	19900	15300	22300	40200	36000	35200	38100	36100	34600	75500
12	38600	35100	18300	13400	22600	43100	36600	35400	38400	34700	34200	58700
13	38600	34700	18400	14500	23700	47400	36500	35700	38000	33500	34100	49800
14	39400	33400	18000	17600	25000	43800	37100	36000	37600	35300	34300	44400
15	39400	31800	18000	19400	25900	38500	37300	35900	37300	35700	34400	42500
16	39300	30700	19500	19600	25700	35700	37300	36400	36400	36900	34900	41500
17	39800	29200	21000	19500	24700	33100	37200	36200	35600	37100	34900	39900
18	40100	26900	20800	20100	24100	30100	37300	36200	36100	38400	34400	39300
19	39800	24300	19300	21100	24100	28500	37600	36700	35700	43500	34200	38800
20	40500	23000	18800	21300	24100	24800	37300	36800	35500	43300	34500	37900
21	40200	22700	20400	22000	23700	23500	36400	37400	35500	42600	34600	37000
22	40100	22600	22400	22800	22400	23300	36900	37300	35900	39900	35100	36500
23	39900	21800	24000	22700	20900	23200	36800	36900	42700	38400	36400	36400
24	39000	21500	24600	22100	21800	23000	36900	36900	40200	37600	36600	35700
25	38400	21300	24100	22800	22600	22900	37200	37000	45900	37600	35900	35200
26	38400	20700	22300	23700	21600	22900	36500	37800	57000	36200	35300	34900
27	38300	21200	21100	23000	21600	23100	37300	37600	44500	35500	35600	35000
28	38300	21100	19400	21600	23400	24600	39900	37000	43700	36500	42700	34600
29	38000	21300	18900	20900	---	28200	39600	36900	41500	35600	51500	34600
30	37800	21200	18600	22600	---	33200	37600	37600	41100	35400	39000	34600
31	37700	---	16200	24300	---	36400	---	40200	---	40500	35000	---
TOTAL	1224800	900800	629800	625000	597370	872300	1109400	1136300	1163000	1187300	1122700	1391900
MEAN	39510	30030	20320	20160	21330	28140	36980	36650	38770	38300	36220	46400
MAX	47800	38700	24600	25600	26800	47400	39900	40200	57000	43500	51500	114000
MIN	37700	20700	16200	13400	8190	17300	35400	35200	34600	33500	34100	33300
AC-FT	2429000	1787000	1249000	1240000	1185000	1730000	2200000	2254000	2307000	2355000	2227000	2761000

CAL YR 1988 TOTAL 13055600 MEAN 35670 MAX 50700 MIN 16200 AC-FT 25900000
WTR YR 1989 TOTAL 11960670 MEAN 32770 MAX 114000 MIN 8190 AC-FT 23720000

06817000 NODAWAY RIVER AT CLARINDA, IA

LOCATION.--Lat 40°44'19", long 95°00'47", in SW1/4 NE1/4 sec.32, T.69 N., R.36 W., Page County, Hydrologic Unit 10240009, near left abutment on downstream side of bridge on State Highway 2 (city route), 0.5 mi downstream from North Branch, 1.2 mi east of city square of Clarinda, and 7.5 mi upstream from East Nodaway River.

DRAINAGE AREA.--762 mi^2.

WATER DISCHARGE RECORDS

PERIOD OF RECORD.--May 1918 to July 1925, May 1936 to current year. Monthly discharge only for some periods, published in WSP 1310.

REVISED RECORDS.--WSP 1240: 1918-20 (M), 1921, 1922-25 (M), 1936-38, 1942, 1943-45 (M), 1948. WSP 1440: Drainage area. WSP 1710: 1958, 1959 (P).

GAGE.--Water-stage recorder. Datum of gage is 955.36 ft above NGVD. Prior to July 5, 1925, and May 28, 1936, to Mar. 26, 1957 nonrecording gage at same site, and prior to Oct. 1, 1987, at datum 5.00 ft. higher.

REMARKS.--Estimated daily discharges: Dec. 16-18, 21, 22, 29,30, Jan. 8-10, 16-18, 21-22, and Feb. 1 to Mar. 9. Records good except those for estimated daily discharges, which are poor. Clarinda municipal water supply is taken from Nodaway River, 500 ft upstream from station. Average daily pumpage was 1.57 ft^3/s. U.S. National Weather Service Limited Automatic Remote Collector (LARC) at station.

COOPERATION.--Average pumpage provided by City of Clarinda water works.

AVERAGE DISCHARGE.--59 years (1918-24, 1936-89), 351 ft^3/s, 6.26 in/yr, 254,300 acre-ft/yr; median of yearly mean discharges, 280 ft^3, 5.0 in/yr, 203,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,100 ft^3/s June 13, 1947, gage-height, 25.3 ft, from floodmark, from rating curve extended above 15,000 ft^3/s on basis of an overflow profile and extended channel rating; minimum daily discharge, 1.0 ft^3/s Sept. 5, 9, 12, 14, 1918, Dec. 9, 27-31, 1923.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1903 reached a stage of 25.4 ft, from floodmarks, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 10	0345	9,280	13.30	Sept. 7	1549	7,000	12.93
June 22	1315	20,500	19.55	Sept. 9	0135	*28,700	*23.27
June 25	0900	18,400	18.54				

Minimum discharge, 13 ft^3/s Nov. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79	20	41	29	80	50	59	49	29	214	149	67
2	58	23	38	41	40	50	54	44	26	212	88	52
3	39	26	40	30	28	50	49	45	30	190	66	47
4	32	26	39	39	22	60	47	46	31	158	58	175
5	28	24	35	34	23	56	44	41	28	136	53	186
6	27	23	37	38	24	54	43	38	25	118	48	159
7	27	25	38	41	27	56	39	36	22	102	44	2380
8	28	26	28	37	32	66	39	35	35	92	39	18200
9	25	24	27	32	29	140	40	32	107	82	35	19000
10	23	23	31	35	27	3890	39	30	61	76	36	3840
11	23	24	34	37	30	1090	39	27	42	70	36	1300
12	24	29	32	39	33	474	35	29	35	68	35	876
13	25	33	35	39	37	294	34	30	28	72	34	690
14	24	33	34	29	34	189	35	29	24	112	31	584
15	24	38	40	30	31	148	37	27	23	114	29	495
16	24	248	28	35	31	115	37	25	24	101	34	425
17	21	335	31	36	31	94	36	25	24	84	34	375
18	18	171	33	35	32	77	35	29	28	119	34	335
19	20	93	35	38	34	78	35	31	25	595	37	295
20	25	69	42	40	35	75	34	31	20	232	40	264
21	27	56	42	43	37	70	33	29	20	141	40	242
22	26	50	38	38	39	73	33	26	7340	106	42	223
23	23	47	42	38	32	69	35	27	3010	94	35	198
24	22	46	53	38	28	63	34	28	658	74	31	180
25	22	45	33	42	35	61	34	28	10500	65	37	173
26	23	47	32	38	68	65	31	24	2890	58	43	168
27	23	44	51	34	56	60	29	22	749	53	465	158
28	22	34	43	42	52	57	49	27	450	49	208	148
29	23	47	37	132	---	56	63	34	314	48	153	143
30	23	41	38	643	---	58	50	32	248	53	113	137
31	23	---	36	271	---	62	---	32	---	186	85	---
TOTAL	851	1770	1143	2073	1007	7800	1201	988	26846	3874	2212	51515
MEAN	27.5	59.0	36.9	66.9	36.0	252	40.0	31.9	895	125	71.4	1717
MAX	79	335	53	643	80	3890	63	49	10500	595	465	19000
MIN	18	20	27	29	22	50	29	22	20	48	29	47
AC-FT	1690	3510	2270	4110	2000	15470	2380	1960	53250	7680	4390	102200
CFSM	.04	.08	.05	.09	.05	.33	.05	.04	1.17	.16	.09	2.25
IN.	.04	.09	.06	.10	.05	.38	.06	.05	1.31	.19	.11	2.51

CAL YR 1988 TOTAL 33959 MEAN 92.8 MAX 800 MIN 17 AC-FT 67360 CFSM .12 IN. 1.66
WTR YR 1989 TOTAL 101280 MEAN 277 MAX 19000 MIN 18 AC-FT 200900 CFSM .36 IN. 4.94

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

LOCATION.--Suspended-sediment samples at normal flows and during winter periods are collected downstream from the dam, 300 ft upstream from gage. Samples at higher stages are collected from the bridge at gage or the Highway 2 bridge.

PERIOD OF RECORD.--October 1976 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1975 to current year.
WATER TEMPERATURES: October 1975 to September 1978, October 1979 to current year.
SUSPENDED-SEDIMENT DISCHARGE: October 1975 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis. Random water temperatures are on file for the 1979 water year.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 600 microsiemens Aug. 22, 1982; minimum daily, 130 microsiemens June 15, 1976.
WATER TEMPERATURES: Maximum daily, 31.0°C Aug. 8, 1988; minimum daily, 0.0°C on many days during winter period.
SEDIMENT CONCENTRATIONS: Maximum daily mean, 23,800 mg/L Apr. 17, 1978; minimum daily mean, 3 mg/L Dec. 1, 1986.
SEDIMENT LOADS: Maximum daily, 1,500,000 tons June 16, 1982; minimum daily, 0.23 ton Dec. 14, 1977.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum daily, 561 microsiemens Feb. 4; minimum daily, 150 microsiemens June 23.
WATER TEMPERATURE: Maximum daily, 29.0°C July 8, 28.
SEDIMENT CONCENTRATIONS: Maximum daily mean,14,500 mg/L Sep. 8; minimum daily mean, 4 mg/L Oct. 29, 30.
SEDIMENT LOADS: Maximum daily, 933,000 tons Sept. 8; minimum daily, 0.25 ton Oct. 29, 30.

SPECIFIC CONDUCTANCE MICROSIEMENS/CM AT 25 DEG C, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	380	420	450	480	322	459	482	430	435	432	282	420
2	340	425	460	500	379	461	474	460	409	415	346	437
3	370	425	465	480	448	461	476	510	415	372	400	---
4	380	425	470	479	561	---	477	450	420	407	425	315
5	400	415	475	453	546	419	483	455	427	410	435	268
6	400	420	465	424	539	435	467	460	437	425	373	384
7	400	425	420	402	523	458	461	460	438	394	406	334
8	390	425	430	469	512	454	454	450	438	324	423	286
9	390	425	445	500	525	411	453	440	242	315	430	---
10	380	430	460	480	517	186	452	440	363	299	435	---
11	380	425	480	492	515	185	427	450	377	285	433	335
12	397	415	495	460	513	222	446	445	362	312	418	347
13	400	425	450	455	502	266	440	425	416	311	420	371
14	390	425	430	454	483	317	435	---	437	353	416	394
15	376	430	420	453	494	350	437	420	445	360	413	419
16	373	410	435	440	492	380	441	430	426	345	429	426
17	379	270	460	442	462	411	433	435	415	---	421	434
18	372	300	455	427	473	433	443	435	410	396	408	436
19	390	380	420	402	482	438	431	425	408	314	410	446
20	403	425	385	399	---	439	438	435	410	242	383	458
21	407	460	385	430	468	456	450	450	436	370	386	461
22	402	460	395	420	473	466	420	460	435	---	396	469
23	410	455	365	406	475	457	405	440	150	425	404	462
24	420	455	364	404	496	462	415	440	223	433	414	466
25	418	450	380	365	496	468	420	440	---	442	419	---
26	418	445	416	385	503	481	420	440	---	445	423	470
27	432	435	435	403	470	459	425	445	227	439	399	---
28	385	450	472	428	451	470	410	445	345	381	229	470
29	400	455	505	398	---	468	365	425	379	317	286	466
30	400	445	504	325	---	448	---	440	403	325	389	462
31	390	---	510	289	---	462	---	440	---	378	398	---
MAX	432	460	510	500	---	---	---	---	---	---	435	---
MIN	340	270	364	289	---	---	---	---	---	---	229	---

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.0	11.0	---	---	---	---	10.0	14.0	20.0	27.0	26.0	24.0
2	14.0	8.0	---	---	---	---	11.0	13.0	21.0	---	25.0	24.0
3	14.0	12.0	---	---	---	---	13.0	14.0	22.0	27.0	27.0	---
4	13.0	12.0	---	---	---	---	12.0	14.0	21.0	27.0	---	24.0
5	12.0	11.0	---	---	---	---	12.0	15.0	21.0	28.0	28.0	22.0
6	12.0	7.0	---	---	---	---	12.0	10.0	22.0	28.0	25.0	22.0
7	8.0	8.0	---	---	---	---	9.0	13.0	23.0	28.0	22.0	24.0
8	12.0	8.0	---	---	---	---	10.0	16.0	23.0	29.0	21.0	21.0
9	12.0	10.0	---	---	---	4.0	8.0	17.0	21.0	27.0	22.0	---
10	15.0	8.0	---	---	---	9.0	7.0	17.0	19.0	27.0	23.0	---
11	12.0	6.0	---	---	---	7.0	9.0	18.0	22.0	28.0	24.0	17.0
12	11.0	8.0	---	---	---	8.0	11.0	17.0	22.0	27.0	23.0	15.0
13	14.0	7.0	---	---	---	8.0	11.0	20.0	22.0	26.0	24.0	13.0
14	16.0	8.0	---	---	---	7.0	13.0	---	19.0	26.0	24.0	19.0
15	15.0	15.0	---	---	---	5.0	11.0	19.0	17.0	24.0	23.0	16.0
16	15.0	---	---	---	---	6.0	13.0	21.0	20.0	20.0	22.0	16.0
17	17.0	---	---	---	---	6.0	14.0	19.0	21.0	---	---	20.0
18	13.0	---	---	---	---	3.0	13.0	19.0	20.0	---	---	---
19	17.0	---	---	---	---	4.0	13.0	19.0	22.0	22.0	---	20.0
20	12.0	---	---	---	---	10.0	14.0	19.0	24.0	22.0	---	20.0
21	12.0	---	---	---	---	4.0	16.0	20.0	25.0	24.0	25.0	20.0
22	11.0	---	---	---	---	5.0	20.0	17.0	23.0	---	25.0	20.0
23	13.0	---	---	---	---	7.0	19.0	21.0	21.0	22.0	25.0	13.0
24	9.0	---	---	---	---	10.0	19.0	23.0	22.0	25.0	25.0	13.0
25	11.0	---	---	---	---	10.0	22.0	20.0	---	26.0	25.0	---
26	9.0	---	---	---	---	14.0	23.0	20.0	---	26.0	25.0	14.0
27	11.0	---	---	---	---	11.0	21.0	18.0	25.0	27.0	23.0	---
28	11.0	---	---	---	---	17.0	19.0	19.0	25.0	29.0	22.0	13.0
29	8.0	---	---	---	---	13.0	15.0	22.0	26.0	27.0	23.0	16.0
30	8.0	---	---	---	---	14.0	---	22.0	27.0	27.0	24.0	17.0
31	8.0	---	---	---	---	9.0	---	21.0	---	27.0	26.0	---

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	56	12	10	.54	15	1.7	6	.47	260	56	8	1.1
2	57	8.9	14	.87	15	1.5	6	.66	105	11	8	1.1
3	23	2.4	17	1.2	17	1.8	6	.49	68	5.1	18	2.4
4	19	1.6	27	1.9	18	1.9	6	.63	51	3.0	55	8.9
5	8	.60	17	1.1	28	2.6	7	.64	37	2.3	36	5.4
6	11	.80	10	.62	15	1.5	8	.82	26	1.7	40	5.8
7	10	.73	9	.61	21	2.2	8	.89	19	1.4	14	2.1
8	20	1.5	9	.63	17	1.3	8	.80	15	1.3	7	1.2
9	14	.94	7	.45	7	.51	8	.69	14	1.1	720	1980
10	16	.99	9	.56	9	.75	8	.76	12	.87	4950	73800
11	17	1.1	9	.58	6	.55	7	.70	9	.73	2220	6530
12	20	1.3	8	.63	7	.60	6	.63	8	.71	1620	2070
13	26	1.8	13	1.2	11	1.0	7	.74	9	.90	775	615
14	35	2.3	14	1.2	8	.73	7	.55	9	.83	400	204
15	50	3.2	31	3.2	9	.97	6	.49	16	1.3	210	84
16	64	4.1	917	950	22	1.7	6	.57	18	1.5	134	42
17	38	2.2	1410	1280	24	2.0	6	.58	9	.75	72	18
18	36	1.7	635	293	20	1.8	6	.57	9	.78	42	8.7
19	40	2.2	220	55	6	.57	6	.62	15	1.4	64	13
20	57	3.8	105	20	8	.91	8	.86	19	1.8	49	9.9
21	56	4.1	41	6.2	9	1.0	8	.93	7	.70	44	8.3
22	30	2.1	31	4.2	12	1.2	17	1.7	9	.95	42	8.3
23	23	1.4	31	3.9	12	1.4	20	2.1	11	.95	34	6.3
24	16	.95	29	3.6	23	3.3	18	1.8	6	.45	36	6.1
25	18	1.1	29	3.5	11	.98	20	2.3	11	1.0	36	5.9
26	15	.93	22	2.8	7	.60	13	1.3	12	2.2	34	6.0
27	14	.87	21	2.5	7	.96	15	1.4	8	1.2	33	5.3
28	12	.71	15	1.4	7	.81	17	1.9	9	1.3	33	5.1
29	4	.25	23	2.9	7	.70	160	57	---	---	30	4.5
30	4	.25	23	2.5	8	.82	940	1630	---	---	33	5.2
31	14	.87	---	---	6	.58	525	384	---	---	18	3.0
TOTAL	---	67.69	---	2646.79	---	38.94	---	2097.59	---	103.22	---	85466.6

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

SEDIMENT, SUSPENDED CONCENTRATION (MG/L), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEA CON TRA (MG	LOAD (TONS/ DAY)	MEAN CONCE TRATI (MG/L	LOAD (TONS DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN TRATIO (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN TRATIO (MG/L)	LOAD (TONS/ DAY)	MEAN CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	17	2.7	48	6.4	45	3.5	95	55	268	108	85	15
2	13	1.6	37	4.4	30	2.1	400	229	130	31	70	9.8
3	15	2.0	45	5.5	41	3.3	442	227	90	16	73	9.3
4	14	1.8	51	6.3	39	3.3	190	81	71	11	394	215
5	8	.95	41	4.5	41	3.1	120	44	61	8.7	456	250
6	7	.81	22	2.3	43	2.9	50	16	45	5.8	171	73
7	6	.63	35	3.4	33	2.0	46	13	39	4.6	3950	47100
8	8	.84	48	4.5	301	71	44	11	52	5.5	14500	933000
9	8	.86	50	4.3	2000	649	44	9.7	47	4.4	12500	770000
10	6	.63	48	3.9	400	66	43	8.8	51	5.0	3200	33200
11	7	.74	50	3.6	205	23	49	9.3	60	5.8	1100	3860
12	12	1.1	49	3.8	194	18	54	9.9	59	5.6	600	1420
13	12	1.1	34	2.8	168	13	57	11	60	5.5	400	745
14	13	1.2	37	2.9	147	9.5	94	28	66	5.5	310	489
15	11	1.1	35	2.6	97	6.0	135	42	92	7.2	241	322
16	13	1.3	40	2.7	98	6.4	158	43	92	8.4	195	224
17	12	1.2	38	2.6	90	5.8	120	27	66	6.1	175	177
18	13	1.2	40	3.1	98	7.4	350	112	70	6.4	170	154
19	13	1.2	45	3.8	80	5.4	2380	4490	54	5.4	155	123
20	13	1.2	47	3.9	60	3.2	770	482	54	5.8	151	108
21	17	1.5	41	3.2	58	3.1	195	74	49	5.3	110	72
22	23	2.0	40	2.8	8420	321000	139	40	59	6.7	68	41
23	24	2.3	41	3.0	6360	69900	122	31	42	4.0	44	24
24	19	1.7	47	3.6	1750	3110	66	13	50	4.2	35	17
25	17	1.6	51	3.9	10300	367000	55	9.7	56	5.6	31	14
26	18	1.5	43	2.8	3150	24600	45	7.0	76	8.8	29	13
27	24	1.9	39	2.3	1110	2240	37	5.3	1560	2770	27	12
28	195	26	42	3.1	480	583	31	4.1	780	438	20	8.0
29	415	71	54	5.0	310	263	35	4.5	460	190	13	5.0
30	112	15	37	3.2	160	107	41	5.9	210	64	8	3.0
31	---	---	49	4.2	---	---	247	169	115	26	---	---
TOTAL	---	148.96	---	114.4	---	789710.0	---	6312.2	---	3784.3	---	1791703.1
YEAR		2682193.79										

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 27...	0945	7.0	9	0.0	--	--	--	--	--	--	--	100
NOV 17...	0800	5.0	1480	0.0	57	82	96	98	--	--	--	100
DEC 13...	1600	--	13	0.0	--	--	--	--	--	--	--	80
JAN 26...	1545	--	9	0.0	--	--	--	--	--	--	--	94
MAR 09...	1445	--	40	0.0	--	--	--	--	--	--	--	98
APR 20...	1800	17.0	18	0.0	--	--	--	--	--	--	--	97
JUN 20...	1100	18.0	43	0.0	--	--	--	--	--	--	--	87
22...	1715	18.0	10800	0.0	43	50	59	71	99	99	100	--
JUL 07...	0900	27.0	50	0.0	--	--	--	--	--	--	--	98
AUG 18...	1000	20.0	71	0.0	--	--	--	--	--	--	--	99

06817000 NODAWAY RIVER AT CLARINDA, IA--Continued

WATER-QUALITY RECORDS

PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	NUMBER OF SAM- PLING POINTS (COUNT) (00063)	BED MAT. SIEVE DIAM. % FINER THAN .062 MM (80164)	BED MAT. SIEVE DIAM. % FINER THAN .125 MM (80165)	BED MAT. SIEVE DIAM. % FINER THAN .250 MM (80166)	BED MAT. SIEVE DIAM. % FINER THAN .500 MM (80167)	BED MAT. SIEVE DIAM. % FINER THAN 1.00 MM (80168)
OCT 27...	0920	3	1	2	20	79	97
DEC 13...	1555	3	1	2	15	64	78
JAN 26...	1515	3	1	12	16	69	90
MAR 09...	1420	3	6	9	21	41	64
APR 20...	1730	3	1	2	12	60	84
JUN 02...	1045	3	1	1	9	48	78
JUL 07...	1410	3	6	7	27	27	57
AUG 18...	0945	3	--	0	2	10	23

DATE	BED MAT. SIEVE DIAM. % FINER THAN 2.00 MM (80169)	BED MAT. SIEVE DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. SIEVE DIAM. % FINER THAN 8.00 MM (80171)	BED MAT. SIEVE DIAM. % FINER THAN 16.0 MM (80172)	BED MAT. SIEVE DIAM. % FINER THAN 32.0 MM (80173)	BED MAT. SIEVE DIAM. % FINER THAN 64.0 MM (80174)
OCT 27...	99	99	100	--	--	--
DEC 13...	80	81	82	100	--	--
JAN 26...	93	95	97	100	--	--
MAR 09...	74	79	85	91	100	--
APR 20...	92	93	96	100	--	--
JUN 02...	85	88	92	95	100	--
JUL 07...	75	86	95	98	100	--
AUG 18...	33	43	56	75	96	100

06818750 PLATTE RIVER NEAR DIAGONAL, IA

LOCATION.--Lat 40°46'02", long 94°24'46", in NE1/4 NW1/4 sec.22, T.69 N., R.31 W., Ringgold County, Hydrologic Unit 10240012, on left bank at downstream side of bridge on county highway, 2.2 mi upstream from Turkey Creek, 4.6 mi southwest of Diagonal, and 4.9 mi downstream from Gard Creek.

DRAINAGE AREA.--217 mi^2.

PERIOD OF RECORD.--April 1968 to current year.

REVISED RECORDS.--WSP 2119: 1969 (P).

GAGE.--Water-stage recorder. Datum of gage is 1,095.27 ft above NGVD.

REMARKS.--Estimated daily discharges: Dec. 8-19, 21-30, Jan. 2-4, 8-13, Feb. 1 to Mar. 9, 18-20, and June 4 to July 17. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--21 years, 131 ft^3/s, 8.20 in/yr, 94,910 acre-ft/yr; median of yearly mean discharges, 110 ft^3/s, 6.9 in/yr, 79,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,630 ft^3/s Sept. 9, 1989, gage height, 23.60 ft; minimum daily discharge, 0.21 ft^3/s Jan. 14, 15, 1969.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1967 reached a stage of 23.16 ft, from floodmark by local resident, discharge, 6,360 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft $^3/s$ and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 7	2300	3140	15.87	Sept. 9	2300	*8630	*23.60

Minimum discharge, .23 ft^3/s Aug. 18, 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.2	2.3	3.4	2.7	13	5.8	7.1	5.9	9.1	2.3	6.5	3.0
2	3.6	1.9	3.5	1.9	4.5	4.7	4.8	18	9.6	1.8	3.1	3.0
3	1.9	2.2	3.5	1.4	2.0	6.0	3.7	12	5.7	1.5	1.6	5.8
4	2.0	2.5	3.2	1.7	1.5	19	3.1	6.6	3.7	1.8	1.2	88
5	1.9	2.1	3.0	1.4	1.0	11	3.3	6.9	2.9	2.2	.88	148
6	1.9	2.3	3.0	2.0	1.4	5.6	3.2	4.0	2.6	1.8	.90	42
7	2.1	2.9	2.8	4.5	1.9	4.6	2.4	4.1	2.3	1.4	.78	1390
8	1.8	2.7	2.3	4.0	2.6	18	1.6	3.3	2.1	1.2	.80	3910
9	2.0	2.7	1.6	1.9	2.2	60	2.0	3.0	2.0	1.1	.68	7530
10	1.7	2.9	2.1	2.1	1.9	302	3.3	2.4	1.9	1.1	.49	3670
11	1.5	2.9	2.0	2.7	2.3	104	4.5	5.7	1.4	1.4	.49	496
12	1.4	4.9	1.8	3.7	2.9	50	3.3	3.9	1.3	2.1	.63	243
13	1.5	3.8	2.0	2.1	3.7	27	3.1	2.6	1.8	1.4	.65	172
14	1.8	3.8	2.2	2.5	2.6	17	3.5	3.8	2.0	1.1	.68	128
15	1.7	5.1	2.0	3.7	2.0	12	5.3	3.5	3.0	1.2	.56	99
16	1.3	34	1.7	4.2	1.8	9.6	4.8	4.1	1.8	1.6	.59	77
17	1.4	29	1.3	3.5	2.0	7.1	3.0	4.0	1.6	1.8	1.7	63
18	1.4	13	1.4	3.0	2.2	6.0	3.2	9.4	2.1	190	.66	54
19	1.9	5.9	1.5	3.4	2.5	5.0	3.1	11	2.4	61	.61	46
20	2.0	4.4	2.5	4.9	2.7	6.4	3.2	5.0	2.7	22	1.1	40
21	1.7	3.5	1.8	5.9	3.0	9.8	2.4	4.4	2.3	8.7	1.9	35
22	2.2	3.1	2.0	4.5	3.6	5.3	2.5	4.5	2.1	3.7	3.9	31
23	2.0	3.5	2.5	3.4	4.2	4.4	3.7	5.3	2.6	1.7	6.6	27
24	1.7	3.2	2.2	3.7	3.1	3.8	3.2	4.3	3.2	1.3	3.4	23
25	1.7	3.2	1.9	3.8	3.7	3.8	2.9	34	128	1.3	2.2	21
26	1.6	3.8	1.8	3.8	5.0	3.7	2.6	53	139	1.2	5.3	20
27	1.7	3.6	2.1	3.7	7.4	3.6	3.2	17	9.4	1.0	97	19
28	1.6	3.7	1.9	4.1	6.8	5.0	4.6	33	1.8	1.1	53	16
29	1.5	3.9	1.7	65	---	3.8	3.1	45	1.7	.96	64	17
30	1.4	3.7	2.8	52	---	4.4	2.7	38	2.2	1.2	27	12
31	2.4	---	2.9	23	---	6.5	---	16	---	7.6	8.9	---
TOTAL	61.5	166.5	70.4	230.2	93.5	734.9	102.4	373.7	354.3	329.56	297.80	18428.8
MEAN	1.98	5.55	2.27	7.43	3.34	23.7	3.41	12.1	11.8	10.6	9.61	614
MAX	7.2	34	3.5	65	13	302	7.1	53	139	190	97	7530
MIN	1.3	1.9	1.3	1.4	1.0	3.6	1.6	2.4	1.3	.96	.49	3.0
AC-FT	122	330	140	457	185	1460	203	741	703	654	591	36550
CFSM	.01	.03	.01	.03	.02	.11	.02	.06	.05	.05	.04	2.83
IN.	.01	.03	.01	.04	.02	.13	.02	.06	.06	.06	.05	3.16

CAL YR 1988 TOTAL 7907.2 MEAN 21.6 MAX 400 MIN 1.3 AC-FT 15680 CFSM .10 IN. 1.36
WTR YR 1989 TOTAL 21243.56 MEAN 58.2 MAX 7530 MIN .49 AC-FT 42140 CFSM .27 IN. 3.64

06819185 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IA

LOCATION.--Lat 40°39'38", long 94°42'59", in NE1/4 sec.35, T.68 N., R.34 W., Taylor County, Hydrologic Unit 10240013, on left bank at downstream side of bridge of county highway N44, 0.1 mi south of Bedford, 0.4 mi upstream from concrete stablization dam, and 3.0 mi upstream from Daugherty creek.

DRAINAGE AREA.--85.4 mi^2.

PERIOD OF RECORD.--October 1983 to current year. September 1959 to September 1983, at site 2 mi upstream published as "near Bedford" (station 06819190) not equivalent because of difference in drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,069.16 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 28-30, Dec. 5-13, 17, 18, 20-22, 28, 29, 31, Jan. 2-5, 8-10, 13, 14, 21, 25, Feb. 3-19, 21-24, Feb. 27 to Mar. 2, July 27 to Aug. 7, and Sept. 16-30. Records fair except those for estimated daily discharges, which are poor. Slight regulation at low flow by low dam used for water supply in Bedford. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--6 years, 58.1 ft^3/s, 9.24 in/yr, 42,090 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,570 ft^3/s July 14, 1986, gage height 23.47 ft.; minimum daily discharge, no flow several days in July and August, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	0245	*6,740	*22.34	No other peak above base discharge.			

Minimum daily discharge, no flow several days in July and August.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.22	.92	.90	1.2	.49	.07	1.2	.97	.22	2.0	.02	1.8
2	.62	1.5	1.2	.60	.42	.20	1.2	.65	.22	2.9	.01	2.3
3	.22	1.9	.60	.09	.06	.73	1.2	1.1	.22	2.1	.0	3.4
4	.22	1.6	.22	.20	.01	.66	1.2	.98	.22	1.4	.0	6.4
5	.12	1.3	.11	.50	.03	5.8	1.2	1.2	.22	.04	.0	15
6	.55	1.3	.20	1.1	.09	2.2	1.2	1.2	.22	.0	.0	9.4
7	.76	1.3	.13	1.2	.14	1.5	1.2	1.2	.85	.0	.0	281
8	.11	1.3	.14	.30	.20	1.2	1.2	.70	.30	.0	.0	819
9	.22	1.7	.15	.12	.14	2.4	1.2	1.2	.28	.25	.0	3870
10	.22	1.9	.07	.94	.09	20	.81	1.2	.22	1.0	.01	205
11	.64	1.9	.13	1.2	.37	8.1	.85	.68	.24	.0	.51	63
12	.68	2.1	.24	.80	.25	2.7	1.2	.15	.75	.0	.84	29
13	.54	1.6	.42	.39	.15	1.3	1.2	.22	.23	.0	.10	18
14	.22	1.7	.22	.70	.09	.35	1.2	.22	.22	.0	.03	12
15	.70	2.5	.30	1.1	.07	1.1	.80	.22	.22	2.1	.01	7.3
16	.43	.28	.95	.66	.09	.86	1.2	.22	.54	1.7	.01	5.8
17	.59	.22	.02	.72	.13	.37	.66	.77	.98	.13	.0	4.8
18	1.1	.22	.20	.71	.20	.74	.22	1.3	1.5	43	.0	4.0
19	1.1	.22	1.2	.49	.40	1.2	.22	.22	1.4	28	.84	3.4
20	.93	.52	.90	.22	.22	1.2	.22	.22	.23	7.7	1.2	3.0
21	1.2	.22	.35	.12	.12	1.2	.22	.22	.22	4.2	.12	2.6
22	1.2	.22	.45	.90	.05	1.2	.22	.22	1.2	2.5	2.2	2.2
23	.38	.22	.85	.61	.03	1.2	.22	.22	1.2	1.7	2.3	2.0
24	.65	.22	.22	.22	.15	1.2	.22	.22	.52	.12	1.8	1.7
25	.62	.42	1.1	.14	.50	1.2	.50	.22	41	.0	1.5	1.5
26	.22	.22	.63	.86	.22	1.2	.22	.22	36	.0	1.4	1.4
27	.22	.78	.27	.93	.12	1.2	.31	.22	10	.0	7.1	1.3
28	.43	.60	.40	1.8	.04	1.2	.87	.51	5.3	.0	5.7	1.1
29	.22	.40	.70	.96	---	1.2	1.2	.64	4.1	.0	3.8	1.2
30	.73	.59	1.2	.22	---	1.2	1.1	2.9	2.8	.01	1.9	1.0
31	1.4	---	.01	.28	---	1.2	---	.60	---	.02	1.9	---
TOTAL	17.46	29.87	14.48	20.28	4.87	65.88	24.46	20.81	111.62	100.87	33.30	5379.6
MEAN	.56	1.00	.47	.65	.17	2.13	.82	.67	3.72	3.25	1.07	179
MAX	1.4	2.5	1.2	1.8	.50	20	1.2	2.9	41	43	7.1	3870
MIN	.11	.22	.01	.09	.01	.07	.22	.15	.22	.00	.00	1.0
AC-FT	35	59	29	40	9.7	131	49	41	221	200	66	10670
CFSM	.01	.01	.01	.01	.00	.02	.01	.01	.04	.04	.01	2.10
IN.	.01	.01	.01	.01	.00	.03	.01	.01	.05	.04	.01	2.34

CAL YR 1988 TOTAL 2875.46 MEAN 7.86 MAX 103 MIN .01 AC-FT 5700 CFSM .09 IN. 1.25
WTR YR 1989 TOTAL 5823.50 MEAN 16.0 MAX 3870 MIN .00 AC-FT 11550 CFSM .19 IN. 2.54

06897950 ELK CREEK NEAR DECATUR CITY, IA
(Hydrologic bench-mark station)

LOCATION.--Lat 40°43'18", long 93°56'12", near SE corner sec.34, T.69 N., R.27 W., Decatur County, Hydrologic Unit 10280102, at right downstream corner of bridge on county highway, 1,000 ft downstream from West Elk Creek, 5.2 mi upstream from mouth, and 5.7 mi southwest of Decatur City.

DRAINAGE AREA.--52.5 mi^2.

WATER DISCHARGE RECORDS

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 924.70 ft above NGVD. Oct. 1, 1967, to Sept. 30, 1974, at datum 10.00 ft higher.

REMARKS.--Estimated daily discharges: Nov. 28 to Dec. 7, Dec. 13, 14, 16-20, 29, Jan. 1-28, Feb. 3 to Mar. 9 and May 8, 9. Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--22 years, 30.2 ft^3/s, 7.81 in/yr, 21,880 acre-ft/yr; median of yearly mean discharges, 25 ft^3/s, 6.5 in/yr, 18,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,400 ft^3/s June 2, 1980, gage height, 28.22 ft, from rating curve extended above 5,300 ft^3/s on basis of step-backwater computation; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 14, 1967, reached a stage of 18.35 ft, datum in use prior to Oct. 1, 1974, discharge, 17,800 ft^3/s, estimated from rating curve extended above 5,300 ft^3/s on basis of step-backwater computation. Flood of Aug. 6, 1959, reached a stage between 20.5 and 22.5 ft, datum in use prior to Oct. 1, 1974, 300 ft downstream, from information by assistant county engineer, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 8	1030	991	14.09	Sept. 9	unknown	*6,410	*23.21

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.13	.00	.01	.04	.00	.00	.00	.45	1.0	.01	.39	2.1
2	.11	.00	.00	.01	.00	.00	.00	.21	.54	.00	.35	.86
3	.06	.00	.00	.00	.00	.10	.00	.19	1.6	.00	.35	.82
4	.01	.08	.00	.00	.00	.70	.00	.40	.66	.00	.37	17
5	.00	.13	.00	.02	.00	.50	.00	.35	.21	.00	.26	9.6
6	.00	.13	.00	.01	.00	.35	.00	.26	.01	.00	.16	3.3
7	.00	.11	.00	.00	.00	.25	.00	.15	.00	.00	.16	2.0
8	.02	.10	.02	.00	.00	.17	.00	.01	.00	.00	.13	544
9	.07	.16	.01	.00	.00	.35	.00	.00	.00	.00	.13	2070
10	.08	.16	.03	.00	.00	.71	.00	.00	.00	.00	.08	47
11	.02	.14	.00	.00	.00	1.0	.00	.00	.00	.16	.00	14
12	.00	.23	.02	.00	.00	.10	.00	.02	.00	.16	.00	6.6
13	.00	.16	.01	.00	.02	.00	.00	.01	.00	.12	.00	4.0
14	.00	.11	.02	.00	.01	.00	.02	.00	.00	.10	.00	2.5
15	.00	.15	.03	.00	.00	.00	.00	.00	.00	.24	.00	1.6
16	.00	.13	.02	.00	.00	.00	.00	.00	.00	.22	.00	1.1
17	.00	.10	.01	.00	.00	.00	.00	.00	.01	.17	.00	.73
18	.00	.10	.00	.00	.00	.00	.01	.13	.00	.49	.00	.55
19	.00	.10	.00	.00	.00	.00	.00	.36	.00	.33	.00	.41
20	.02	.10	.01	.00	.00	.00	.00	.22	.00	.35	.00	.34
21	.04	.08	.03	.00	.00	.00	.00	.13	.00	.30	.00	.23
22	.04	.12	.05	.00	.00	.00	.00	.13	.00	.32	.00	.12
23	.05	.13	.06	.00	.00	.00	.00	.09	.01	.37	.31	.00
24	.02	.13	.08	.00	.00	.00	.00	.13	.00	.35	.00	.02
25	.02	.18	.03	.00	.00	.00	.09	15	.00	.30	.00	.00
26	.00	.18	.06	.00	.00	.00	.10	3.0	.02	.34	.05	.00
27	.00	.10	.07	.04	.00	.00	.06	.50	.00	.36	.47	.00
28	.00	.07	.03	.05	.00	.00	.09	.83	.00	.30	11	.00
29	.00	.03	.02	.01	---	.00	.04	4.6	.00	.38	34	.02
30	.00	.02	.09	.00	---	.00	.05	1.3	.00	.45	5.5	.08
31	.00	---	.11	.00	---	.00	---	.35	---	.41	2.8	---
TOTAL	0.69	3.23	0.82	0.18	0.03	4.23	0.46	28.82	4.06	6.23	56.51	2728.98
MEAN	.022	.11	.026	.006	.001	.14	.015	.93	.14	.20	1.82	91.0
MAX	.13	.23	.11	.05	.02	1.0	.10	15	1.6	.49	34	2070
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	1.4	6.4	1.6	.4	.06	8.4	.9	57	8.1	12	112	5410
CFSM	.00	.00	.00	.00	.00	.00	.00	.02	.00	.00	.03	1.73
IN.	.00	.00	.00	.00	.00	.00	.00	.02	.00	.00	.04	1.93

CAL YR 1988 TOTAL 1286.31 MEAN 3.51 MAX 80 MIN .00 AC-FT 2550 CFSM .07 IN. .91
WTR YR 1989 TOTAL 2834.24 MEAN 7.77 MAX 2070 MIN .00 AC-FT 5620 CFSM .15 IN. 2.01

06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued
(Hydrologic bench-mark station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968 to current year.

REMARKS.--Miscellaneous biological data collected September 1970 to September 1972 are available in the Iowa City district office.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
JUN											
06...	0715	0.01	660	8.10	19.0	14.5	6.7	4.2	47	732	290

DATE	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3 (00902)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)
JUN											
06...	450	27	260	70	20	19	12	0.5	32	254	0

DATE	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
JUN											
06...	310	35	42	0.20	9.7	480	375	0.65	0.01	0.130	0.070

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)
JUN											
06...	2.30	2.40	0.520	0.990	1.40	7	<10	120	<0.5	<1	<1

DATE	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)
JUN											
06...	5	2	290	1	7	2400	<0.1	20	10	1	<1.0

06897950 ELK CREEK NEAR DECATUR CITY, IA--Continued

(hydrologic bench-mark station)

WATER-QUALITY RECORDS

DATE	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	GROSS ALPHA, DISSOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DISSOLVED (PCI/L AS CS-137) (03515)	GROSS BETA, DISSOLVED (PCI/L AS SR/YT-90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/YT-90) (80060)	RADIUM 226, DISSOLVED, RADON METHOD (PCI/L) (09511)
JUN										
06...	310	<6	12	2.7	2.9	47	37	4.2	3.4	0.03

06898000 THOMPSON RIVER AT DAVIS CITY, IA

LOCATION.--Lat 40°38'25", long 93°48'28", in SE1/4 SE1/4 sec.35, T.68 N., R.26 W., Decatur County, Hydrologic Unit 10280102, on right bank 15 ft downstream from bridge on U.S. Highway 69 at Davis City, 2.6 mi upstream from Dickersons Branch, and 5.2 mi upstream from Iowa-Missouri State line.

DRAINAGE AREA.--701 mi^2.

PERIOD OF RECORD.--May 1918 to July 1925, July 1941 to current year. Monthly discharge only for some periods, published in WSP 1310. Prior to October 1918, published as "Grand River".

REVISED RECORDS.--WSP 1240: 1918, 1920-21 (M), 1922-24, 1925 (M), 1946-47 (M). WSP 1440: Drainage area. WSP 1710: 1957.

GAGE.--Water-stage recorder. Datum of gage is 874.04 ft above NGVD. May 14, 1918, to July 2, 1925, July 14, 1941, to Feb. 24, 1942, nonrecording gage, and Feb. 25, 1942, to Feb. 8, 1967, water-stage recorder at same site at datum 2.00 ft higher.

REMARKS.--Estimated daily discharges: Oct. 5-23, Dec. 11-12, 16, 22, 28-30, Jan. 3, 8-9, Feb. 2-25, and June 3-5. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. National Weather Service Limited Automatic Remote Collector at station.

AVERAGE DISCHARGE.--54 years (water years 1919-24,1942-89), 373 ft^3/s, 7.23 in/yr, 270,200 acre-ft/yr; median of yearly mean discharges, 320 ft^3/s, 6.2 in/yr 232,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,300 ft^3/s June 10, 1974, gage height, 19.43 ft, from rating curve extended above 17,000 ft^3/s on basis of velocity-area study; minimum daily discharge, 0.1 ft^3/s June 25, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 8, 1885, reached a stage of 22.8 ft, datum in use prior to Feb. 9, 1967, from floodmark, discharge, 30,000 ft^3/s, from rating curve extended as explained above.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	1815	*8,720	*9.76	No other peak greater than base discharge.			

Minimum daily discharge, 0.41 ft^3/s Aug. 19-22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.4	4.5	12	7.3	217	5.7	13	11	51	41	3.4	18
2	6.5	5.5	12	6.4	27	5.6	12	15	34	23	2.8	8.2
3	7.0	7.4	11	5.9	4.0	7.2	12	18	29	15	2.6	4.9
4	6.2	11	10	6.0	3.2	11	12	24	25	13	8.3	5.5
5	5.4	16	8.3	6.4	3.4	21	11	24	22	10	11	12
6	3.5	17	7.7	6.5	3.6	60	10	18	19	7.0	6.4	12
7	2.5	14	7.6	7.5	4.1	37	9.4	15	14	5.7	4.0	10
8	1.7	15	6.6	5.4	4.6	36	8.6	14	10	6.1	2.8	58
9	3.4	17	5.6	3.9	4.2	34	7.6	12	7.6	6.5	2.0	4690
10	2.3	13	5.5	4.3	4.0	32	6.9	9.5	5.7	8.0	1.5	4460
11	1.5	8.3	4.8	4.8	9.9	370	6.8	7.8	4.9	59	1.4	1980
12	.89	13	4.9	4.9	8.0	705	6.8	6.5	4.5	19	1.2	664
13	.80	27	5.0	4.8	6.0	320	6.4	5.7	5.8	8.3	.91	379
14	.75	8.3	5.7	4.6	5.4	173	6.6	4.9	12	7.5	.68	270
15	.68	8.9	5.6	4.2	5.1	113	6.4	4.4	8.1	6.8	.68	209
16	1.1	11	4.8	4.1	4.8	77	6.8	3.6	6.1	4.7	.62	164
17	.86	8.1	5.4	4.3	4.5	54	6.9	3.0	4.6	6.3	.55	136
18	1.0	41	5.0	4.5	4.6	35	7.2	5.2	5.6	9.8	.49	111
19	1.3	60	5.4	4.7	4.8	29	7.4	8.4	5.0	7.1	.41	92
20	1.2	40	7.1	5.5	5.0	24	7.4	9.3	3.7	6.0	.41	79
21	.86	23	7.9	5.4	5.2	19	7.5	9.8	2.9	5.2	.41	68
22	1.1	36	7.0	4.9	4.9	17	7.1	11	2.5	13	.41	58
23	1.3	26	7.7	5.1	4.3	16	8.1	8.2	2.3	29	.75	47
24	1.6	18	9.0	5.8	4.6	16	7.0	6.1	2.1	17	3.0	39
25	1.3	13	8.5	7.7	4.9	16	7.2	52	1.7	11	3.0	35
26	.75	18	7.7	8.1	5.2	16	7.1	83	2.4	7.9	2.8	31
27	.60	16	9.2	7.5	5.3	14	6.9	33	72	5.5	10	28
28	1.7	12	7.4	9.5	5.8	15	11	44	184	5.0	33	26
29	1.7	11	6.8	15	---	16	11	75	143	7.4	176	23
30	1.5	9.6	7.5	16	---	15	8.0	96	74	9.8	108	22
31	2.9	---	7.7	21	---	14	---	87	---	5.1	28	---
TOTAL	70.29	528.6	226.4	212.0	373.4	2323.5	252.1	724.4	764.5	385.7	417.52	13739.6
MEAN	2.27	17.6	7.30	6.84	13.3	75.0	8.40	23.4	25.5	12.4	13.5	458
MAX	7.0	60	12	21	217	705	13	96	184	59	176	4690
MIN	.60	4.5	4.8	3.9	3.2	5.6	6.4	3.0	1.7	4.7	.41	4.9
AC-FT	139	1050	449	421	741	4610	500	1440	1520	765	828	27250
CFSM	.00	.03	.01	.01	.02	.11	.01	.03	.04	.02	.02	.65
IN.	.00	.03	.01	.01	.02	.12	.01	.04	.04	.02	.02	.73

CAL YR 1988 TOTAL 29247.29 MEAN 79.9 MAX 1240 MIN .60 AC-FT 58010 CFSM .11 IN. 1.55
WTR YR 1989 TOTAL 20018.01 MEAN 54.8 MAX 4690 MIN .41 AC-FT 39710 CFSM .08 IN. 1.06

06898400 WELDON RIVER NEAR LEON, IA

LOCATION--Lat 40°41'45, long 93°38'07", in NE1/4 NE1/4 sec.17, T.68 N., R.24 W., Decatur County, Hydrologic Unit 10280102, on left bank 10 ft downstream from bridge on county highway A, 200 ft upstream from Unnamed Creek, 1.3 mi downstream from Brush Creek, and 6.5 mi southeast of post office at Leon.

DRAINAGE AREA.--104 mi^2.

PERIOD OF RECORD.--October 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 906.26 ft above NGVD.

REMARKS.--Estimated daily discharges: Nov. 28, 29, Dec. 21, 22, 28-31, Jan. 3-5, 8-10, 15-17, Feb. 1-16, Mar. 8, 9, Mar. 15 to Apr. 12, Apr. 15-17, July 11-14, 18, and Sept. 12-30. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--31 years, 68.4 ft^3/s, 8.93 in/yr, 49,560 acre-ft/yr; median of yearly mean discharges, 59 ft^3/s, 7.7 in/yr, 42,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 48,600 ft^3/s Aug. 6, 1959, gage height, 25.27 ft, from rating curve extended above 5,600 ft^3/s on basis of contracted-opening and flow-over-embankment measurement; no flow some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Stage and discharge of the flood of Aug. 6, 1959 are the greatest since at least 1919.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	0215	*7,130	*18.45	No other peak greater than base discharge.			

No flow Oct. 13, Apr. 22, May 16, 17, June 20-26, July 7-10, and Aug. 13-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.76	.68	.80	.33	.45	.60	.56	3.5	44	.35	4.6	29
2	.09	.60	.80	.72	.20	.38	.46	2.0	16	.13	4.4	27
3	.06	.60	.67	.15	.09	12	.40	2.2	4.7	.23	5.1	30
4	.22	.83	.52	.10	.01	163	.33	1.6	3.1	.12	4.8	58
5	.19	.66	.64	.33	.03	94	.29	1.2	1.9	.45	3.9	47
6	.27	.73	.67	.68	.10	36	.26	.73	1.2	.01	3.1	44
7	.25	.74	1.4	1.2	.16	17	.23	.53	.87	.00	2.4	46
8	.36	.62	.49	.45	.25	5.4	.60	.57	.55	.00	1.8	711
9	1.0	.92	.44	.14	.15	2.9	.50	.45	.33	.00	1.6	2990
10	.06	1.9	.55	.25	.10	17	.41	.25	.22	.00	1.1	11
11	.03	1.2	.20	.34	.44	22	.36	.20	3.1	.10	.58	.20
12	.62	1.9	.19	.53	.30	12	.30	.19	3.7	2.0	.15	.15
13	.00	1.6	.34	.33	.15	5.9	.27	.14	1.5	1.2	.00	.12
14	.06	2.2	.67	.15	.11	3.3	.15	.11	.72	.72	.00	.10
15	.10	1.9	.26	.30	.08	1.5	.12	.03	.31	.41	.08	.09
16	.07	2.8	.21	.23	.10	.80	.10	.00	.07	.88	.04	.08
17	.04	3.6	.01	.26	.12	.52	.18	.00	.11	.65	.06	.07
18	.10	1.4	.08	.29	.17	.70	.41	1.4	.49	1.1	.53	.07
19	.11	.92	.50	.35	.41	.49	.60	3.2	.17	.53	.78	.06
20	.27	.63	1.4	.33	.55	.80	.52	12	.00	.68	1.7	.06
21	.87	.51	.39	.93	.33	.64	.09	12	.00	.54	1.7	.05
22	.25	.51	.50	1.6	.23	.52	.00	21	.00	.53	1.9	.05
23	.21	.65	.66	.76	.13	.45	.05	27	.00	.74	9.8	.05
24	.32	.62	1.1	.42	.11	.40	.04	38	.00	.84	19	.04
25	.29	1.4	.49	1.3	.24	.35	.09	76	.00	.62	27	.04
26	.18	2.9	.71	1.2	.56	.31	.19	43	.00	.63	36	.04
27	.18	1.3	1.5	.84	.93	.33	.25	17	.02	.65	63	.04
28	.16	.70	.30	.93	.68	.92	1.2	63	.10	7.1	65	.03
29	.19	.58	.10	1.5	---	.80	.43	147	.07	5.7	75	.03
30	.38	.98	.15	.68	---	.60	.61	23	.17	6.6	29	.05
31	.33	---	.25	1.2	---	.76	---	6.1	---	5.0	74	---
TOTAL	8.02	36.58	16.99	18.82	7.18	402.37	10.00	503.40	83.40	38.51	438.12	3994.42
MEAN	.26	1.22	.55	.61	.26	13.0	.33	16.2	2.78	1.24	14.1	133
MAX	1.0	3.6	1.5	1.6	.93	163	1.2	147	44	7.1	75	2990
MIN	.00	.51	.01	.10	.01	.31	.00	.00	.00	.00	.00	.03
AC-FT	16	73	34	37	14	798	20	998	165	76	869	7920
CFSM	.00	.01	.01	.01	.00	.12	.00	.16	.03	.01	.14	1.28
IN.	.00	.01	.01	.01	.00	.14	.00	.18	.03	.01	.16	1.43

CAL YR 1988 TOTAL 2641.94 MEAN 7.22 MAX 304 MIN .00 AC-FT 5240 CFSM .07 IN. .95
WTR YR 1989 TOTAL 5557.81 MEAN 15.2 MAX 2990 MIN .00 AC-FT 11020 CFSM .15 IN. 1.99

06903400 CHARITON RIVER NEAR CHARITON, IA

LOCATION.--Lat 40°57'12", long 93°15'37", in SW1/4 NE1/4 sec.15, T.71 N., R.21 W., Lucas County, Hydrologic Unit 10280201, on right bank 15 ft downstream from bridge on county highway S43, 0.4 mi downstream from Wolf Creek and 5.0 mi southeast of Chariton.

DRAINAGE AREA.--182 mi^2.

PERIOD OF RECORD.--October 1965 to current year. Occasional low-flow measurements, water years 1958-60, 1962, 1964.

GAGE.--Water-stage recorder. Datum of gage is 917.90 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Oct. 8-11, 20-24, Nov. 4-25, Nov. 28 to Mar. 14, Mar. 23 to Apr. 27, Apr. 29, 30, May 7-17, 21-26, June 16, 17, July 15-17, July 21 to Aug. 1, Aug. 23, 27, Sept. 4-7, and Sept. 23. Records fair except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers data collection platform at station.

AVERAGE DISCHARGE.--24 years, 113 ft^3/s, 8.43 in/yr, 81,870 acre-ft/yr; median of yearly mean discharges, 92.0 ft^3/s, 6.9 in/yr, 66,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,600 ft^3/s July 4, 1981, gage height, 23.14 ft; no flow at times during some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1960 reached a stage of about 23 ft, discharge, about 15,000 ft^3/s and flood of June 5, 1947 reached a stage of 21.65 ft, from floodmark, discharge, 11,000 ft^3/s. A discharge of 0.08 ft^3/s was measured on Oct. 30, 1963.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	1445	*1,200	*15.01				

No flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	.00	.09	.12	1.2	.16	.20	1.4	36	.58	.01	2.1
2	.77	.00	.05	.08	.40	.13	.10	2.4	57	.46	.00	1.2
3	.45	.00	.08	.07	.15	.20	.09	1.1	54	.18	.00	1.1
4	.33	.01	.07	.11	.06	20	.08	.80	28	.06	.00	.60
5	.25	.02	.08	.19	.05	27	.08	.79	12	.01	.00	.40
6	.19	.01	.10	.25	.08	11	.07	.71	6.8	.00	.00	.30
7	.14	.01	.08	.20	.12	14	.06	.45	3.2	.00	.00	.40
8	.09	.01	.06	.12	.10	16	.09	.30	1.4	.00	.00	8.9
9	.05	.01	.05	.07	.17	11	.07	.19	1.1	.00	.00	904
10	.02	.02	.04	.09	.22	8.0	.05	.12	.98	.00	.00	512
11	.00	.01	.03	.13	.24	11	.04	.08	1.4	.10	.00	494
12	.00	.02	.02	.17	.23	14	.03	.05	2.0	.27	.00	173
13	.00	.03	.03	.12	.27	13	.03	.04	6.2	.18	.00	41
14	.00	.02	.04	.13	.25	11	.02	.03	3.1	.03	.00	20
15	.00	.04	.03	.13	.21	9.9	.02	.02	1.1	.02	.00	9.5
16	.00	.07	.02	.14	.22	7.3	.01	.02	.70	.01	.00	4.3
17	.00	.04	.02	.17	.20	5.3	.01	.01	.50	.01	.00	1.6
18	.00	.03	.05	.21	.18	4.5	.04	.52	1.3	.28	.00	.41
19	.00	.02	.08	.23	.18	3.5	.03	.90	1.3	.19	.00	.13
20	.01	.02	.11	.15	.17	2.8	.02	1.0	1.2	.08	.00	.27
21	.01	.02	.07	.11	.19	2.1	.02	.60	.97	.04	.00	.30
22	.02	.01	.08	.09	.16	1.8	.02	.20	.89	.02	.00	.27
23	.01	.01	.11	.17	.15	1.2	.02	.10	.65	.08	.70	.15
24	.01	.01	.15	.25	.17	.90	.02	.30	.52	.35	.45	.04
25	.00	.10	.10	.27	.21	.66	.02	1.0	.69	.22	.30	.05
26	.00	1.9	.13	.23	.27	.47	.01	.70	.98	.12	.35	.14
27	.00	2.9	.20	.21	.22	.35	.01	3.1	1.1	.07	.10	.12
28	.00	1.2	.15	.17	.20	.40	.38	108	1.0	.04	.13	.02
29	.00	.25	.12	.50	---	.30	.25	472	.97	.02	.18	.07
30	.00	.35	.14	1.7	---	.24	.15	238	.81	.02	.14	.07
31	.00	---	.17	2.3	---	.20	---	69	---	.03	.87	---
TOTAL	3.65	7.14	2.55	8.88	6.27	198.41	2.04	903.93	227.86	3.47	3.23	2176.44
MEAN	.12	.24	.082	.29	.22	6.40	.068	29.2	7.60	.11	.10	72.5
MAX	1.3	2.9	.20	2.3	1.2	27	.38	472	57	.58	.87	904
MIN	.00	.00	.02	.07	.05	.13	.01	.01	.50	.00	.00	.02
AC-FT	7.2	14	5.1	18	12	394	4.0	1790	452	6.9	6.4	4320
CFSM	.00	.00	.00	.00	.00	.04	.00	.16	.04	.00	.00	.40
IN.	.00	.00	.00	.00	.00	.04	.00	.18	.05	.00	.00	.44

CAL YR 1988 TOTAL 4300.63 MEAN 11.8 MAX 200 MIN .00 AC-FT 8530 CFSM .06 IN. .88
WTR YR 1989 TOTAL 3543.87 MEAN 9.71 MAX 904 MIN .00 AC-FT 7030 CFSM .05 IN. .72

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IA

LOCATION.--Lat 40°48'02", long 93°11'32", in SW1/4 SW1/4 sec.5, T.69 N., R.20 W., Wayne County, Hydrologic Unit 10280201, on right bank 20 ft downstream from bridge on county highway S50, 1.3 mi downstream from Jordan Creek and 4.3 mi northwest of Promise City.

DRAINAGE AREA.--168 mi^2.

PERIOD OF RECORD.--October 1967 to current year. Occasional low-flow measurements, water years 1958-66, published as "near Bethlehem". Monthly discharge measurements for March 1965 to September 1967 available in files of Iowa City district office.

GAGE.--Water-stage recorder. Datum of gage is 913.70 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Oct.1 to Apr. 26, Apr. 29 to May 23, June 1-10, and July 15 to Aug. 22. Records poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers satellite data collection platform at station.

AVERAGE DISCHARGE.--22 years, 111 ft^3/s, 8.97 in/yr, 80,420 acre-ft/yr; median of yearly mean discharges, 100 ft^3/s, 8.1 in/yr, 72,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,000 ft^3/s July 4, 1981, gage height, 29.95 ft; no flow at times during a few years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 21, 1965, reached a stage of 25.5 ft, from floodmarks, discharge, about 18,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Sept. 9	1230	*1,770	*12.40				

No flow July 9, 10, Aug. 14, and Aug. 18-22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.25	.04	1.4	.80	2.0	.82	1.4	9.0	9.0	.40	.50	18
2	.20	.03	.26	.64	1.5	.70	2.0	7.0	4.5	.62	.25	8.1
3	.16	.02	.60	.52	1.1	.60	3.0	5.2	7.0	.37	.19	4.2
4	.14	.01	.40	.45	.80	15	2.0	8.0	2.5	.25	1.0	5.4
5	.12	.01	.35	.68	.60	7.0	1.5	4.0	1.6	.12	.40	3.6
6	.11	.03	.70	.90	1.1	4.5	1.3	1.6	1.1	.07	.25	2.9
7	.10	.02	.40	.70	.90	3.0	1.2	1.0	.86	.04	.16	3.1
8	.09	.01	.25	.55	.72	2.5	1.1	.60	1.3	.03	.10	15
9	.08	.01	.19	.45	.64	2.2	3.5	.45	.80	.00	.06	1310
10	.33	.02	.16	.54	.80	4.0	1.5	.35	.60	.00	.04	415
11	.22	.01	.15	.40	1.0	8.0	1.2	.27	37	.39	.03	113
12	.15	.04	.14	.34	1.3	5.6	1.0	.21	66	5.9	.02	58
13	.10	.10	.13	.31	1.6	4.0	.80	.17	78	3.6	.01	31
14	.07	.25	.25	.31	1.0	3.0	.70	.14	12	1.4	.0	20
15	.06	.43	.17	.35	1.1	2.4	.65	.12	3.8	.30	.03	14
16	.05	1.5	.12	.40	.90	1.9	.58	.11	1.8	1.0	.02	11
17	.04	.80	.17	.50	.72	2.5	.55	.10	1.2	.30	.01	7.8
18	.03	.48	.22	.80	.54	1.8	1.3	15	1.5	.18	.0	6.2
19	.02	.32	.31	1.2	.47	1.6	.80	7.0	1.3	7.0	.0	3.6
20	.20	.27	.45	.80	.41	1.9	.70	3.0	1.3	3.5	.0	2.1
21	.09	.24	.30	.60	.40	1.7	.60	1.5	1.0	1.5	.0	1.6
22	.60	.22	.22	.50	.54	1.8	.52	1.0	.61	.80	.0	1.4
23	.42	.20	.18	1.5	.47	2.0	.48	.70	.42	.50	3.1	1.0
24	.30	.23	1.8	1.1	.41	1.7	.43	108	.24	9.0	1.2	.69
25	.22	.90	1.3	.83	.63	1.5	.38	140	.26	3.5	.63	.47
26	.15	2.0	1.2	1.8	.84	3.0	.35	105	.39	1.5	.94	.28
27	.11	6.0	2.0	1.5	1.2	2.5	1.1	78	2.3	.60	.89	.32
28	.08	3.0	.80	2.5	1.0	5.0	2.9	164	1.7	.40	18	.27
29	.07	2.0	.60	1.9	---	3.5	1.7	340	1.0	.30	102	.31
30	.06	3.5	.78	2.6	---	2.1	1.0	40	.59	2.0	110	.25
31	.05	---	1.0	3.1	---	1.6	---	7.3	---	2.5	45	---
TOTAL	4.67	22.69	17.00	29.57	24.69	99.42	36.24	1048.82	241.67	48.07	284.83	2058.59
MEAN	.15	.76	.55	.95	.88	3.21	1.21	33.8	8.06	1.55	9.19	68.6
MAX	.60	6.0	2.0	3.1	2.0	15	3.5	340	78	9.0	110	1310
MIN	.02	.01	.12	.31	.40	.60	.35	.10	.24	.00	.00	.25
AC-FT	9.3	45	34	59	49	197	72	2080	479	95	565	4080
CFSM	.00	.00	.00	.01	.01	.02	.01	.20	.05	.01	.05	.41
IN.	.00	.01	.00	.01	.01	.02	.01	.23	.05	.01	.06	.46

CAL YR 1988 TOTAL 4035.91 MEAN 11.0 MAX 145 MIN .01 AC-FT 8010 CFSM .07 IN. .89
WTR YR 1989 TOTAL 3916.26 MEAN 10.7 MAX 1310 MIN .00 AC-FT 7770 CFSM .06 IN. .87

06903880 RATHBUN LAKE NEAR RATHBUN, IA

LOCATION.--Lat 40°49'30", long 92°53'33", in NW1/4 NE1/4 sec.35, T.70 N., R.18 W., Appanoose County, Hydrologic Unit 10280201, at control tower of Rathbun Dam, 1.8 mi north of Rathbun and 3.9 mi upstream from Walnut Creek and at mile 142.3.

DRAINAGE AREA.--549 mi^2.

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD.

REMARKS.--Reservoir is formed by earthfill dam completed in 1969. Storage began in November 1969. Release is controlled by two hydraulically controlled slide gages, 6 ft wide and 12 ft high, into forechamber of an 11-ft diameter horseshoe conduit through the dam. No dead storage. Maximum design discharge through gates is 5,000 ft^3/s. Uncontrolled notch spillway is concrete overflow section 500 ft in length, located about 3,000 ft west of the right abutment of the dam and provides emergency discharge into the adjacent drainage area of Little Walnut Creek. Uncontrolled notch spillway is at elevation 926 ft, contents 545,621 acre-ft, surface area, 20,974 acres. Conservation pool level is at elevation 904.0 ft, contents 199,830 acre-ft, surface area, 10,989 acres. Reservoir is used for flood control, low-flow augumentation, conservation and recreation.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 514,000 acre-ft July 22, 23, 1982; maximum elevation, 924.46 ft July 22, 1982; minimum daily contents, 100 acre-ft Oct. 1-15, Nov. 17-21, 1969; minimum elevation, 855.40 ft Oct. 6-10, 1969.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 177,000 acre-ft Oct. 1; maximum elevation 901.90 ft Oct. 1; minimum daily contents, 156,000 acre-ft Aug. 22-23; minimum elevation, 899.76 ft Aug. 22-23.

Capacity table (elevation, in feet, and contents, in acre-feet)

860	150	880	31,900	905	211,000
862	226	885	52,700	910	272,600
865	950	890	80,300	915	345,000
870	5,870	895	115,600	920	428,900
875	17,000	900	158,800	925	524,900

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
OBSERVATION AT 08:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	177000	171000	170000	168000	168000	166000	166000	164000	166000	164000	161000	159000
2	177000	171000	170000	168000	167000	166000	166000	164000	166000	164000	160000	158000
3	177000	170000	170000	168000	167000	166000	166000	164000	167000	164000	160000	158000
4	177000	171000	170000	168000	167000	166000	166000	164000	166000	164000	160000	158000
5	176000	171000	170000	168000	167000	166000	166000	164000	166000	163000	160000	158000
6	176000	172000	170000	168000	167000	166000	166000	164000	166000	163000	160000	158000
7	176000	170000	170000	168000	167000	166000	165000	164000	166000	163000	160000	158000
8	176000	170000	170000	168000	167000	166000	165000	164000	166000	163000	159000	159000
9	176000	170000	169000	168000	166000	166000	165000	163000	166000	163000	159000	162000
10	175000	171000	169000	168000	166000	166000	165000	163000	166000	162000	159000	163000
11	175000	170000	169000	168000	166000	166000	165000	162000	166000	152000	159000	165000
12	175000	170000	169000	167000	166000	166000	165000	162000	166000	163000	158000	167000
13	175000	171000	169000	167000	166000	166000	165000	162000	166000	163000	158000	167000
14	175000	171000	169000	167000	167000	166000	165000	162000	166000	163000	158000	168000
15	174000	170000	169000	167000	167000	167000	165000	162000	166000	163000	158000	168000
16	174000	172000	169000	167000	167000	166000	165000	162000	165000	163000	158000	167000
17	174000	171000	169000	167000	166000	166000	164000	162000	165000	162000	157000	167000
18	174000	171000	168000	167000	166000	166000	164000	161000	165000	163000	157000	167000
19	174000	171000	168000	167000	166000	166000	164000	162000	165000	163000	157000	167000
20	173000	171000	168000	167000	166000	166000	164000	162000	165000	162000	157000	167000
21	173000	170000	168000	167000	166000	166000	164000	162000	165000	162000	157000	167000
22	173000	170000	168000	167000	166000	166000	164000	162000	165000	162000	156000	167000
23	173000	170000	168000	167000	166000	166000	164000	162000	164000	161000	156000	167000
24	173000	170000	168000	167000	166000	166000	164000	161000	164000	161000	157000	166000
25	172000	170000	168000	167000	166000	166000	164000	162000	164000	161000	157000	166000
26	172000	170000	167000	167000	166000	166000	164000	163000	164000	161000	157000	166000
27	172000	171000	168000	167000	166000	166000	164000	162000	165000	161000	158000	165000
28	172000	171000	168000	167000	166000	166000	164000	162000	165000	161000	158000	165000
29	171000	170000	168000	167000	---	166000	164000	163000	164000	161000	159000	165000
30	171000	170000	168000	167000	---	166000	164000	165000	164000	161000	158000	165000
31	171000	---	168000	167000	---	166000	---	166000	---	161000	159000	---
MEAN	174000	171000	169000	167000	166000	166000	165000	163000	165000	162000	158000	164000
MAX	177000	172000	170000	168000	168000	167000	166000	166000	167000	164000	161000	168000
MIN	171000	170000	167000	167000	166000	166000	164000	161000	164000	161000	156000	158000

CAL YR 1988 MEAN 189000 MAX 218000 MIN 167000
WTR YR 1989 MEAN 166000 MAX 177000 MIN 156000

06903900 CHARITON RIVER NEAR RATHBUN, IA

LOCATION.--Lat 40°49'22", long 92°53'22", in SE1/4 NE1/4 sec.35, T.70 N., R.18 W., Appanoose County, Hydrologic Unit 10280201, on left bank 600 ft downstream from outlet of Rathbun Dam, 1.8 mi north of Rathbun and 3.7 mi upstream from Walnut Creek and at mile 142.1.

DRAINAGE AREA.--549 mi^2.

PERIOD OF RECORD.--October 1956 to current year. Monthly discharge only for some periods, published in WSP 1730.

REVISED RECORDS.--WSP 1560: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 847.92 ft above NGVD. Prior to Nov. 16, 1960, nonrecording gage and Nov. 17, 1960, to Sept. 30, 1969, recording gage, at site 3.1 mi downstream at datum 4.65 ft lower.

REMARKS.--Estimated daily discharges: Nov. 15-16, 27, Dec. 14-15, 27-28, Jan. 7-8, Feb. 2-3, June 25-28, July 30 to Aug. 2, Aug. 29 to Sept. 10, and 24-30. Records fair. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers gage-height telemeter at station. Flow regulated by Rathbun Reservoir (station 06903880) since Nov. 21, 1969. Records of discharge include diversion of:

Date	Discharge (ft^3/s)	Date	Discharge (ft^3/s)
Oct. 1 - May 15	9	May 16 - Sept. 30	11

The diversion goes from the reservoir through fish ponds on left bank downstream from dam. Diverted flow returns to stream 0.1 mi downstream from gage. Rathbun Regional Water Association permit No. 3663 allows withdrawal from Rathbun Dam discharge immediately downstream from gage for maximum rate of 4,200 gpm (9.36 ft^3/s) and maximum quantity of 638 million gallons per year (1,955 acre-ft).

AVERAGE DISCHARGE.--33 years, 336 ft^3/s, 8.31 in/yr, (unadjusted) 243,400 acre-ft/yr; median of yearly mean discharges, 270 ft^3/s, 6.7 in/yr, 196,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,800 ft^3/s Mar. 31, 1960, gage height, 25.3 ft from floodmark, site and datum then in use; no flow Oct. 26, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 320 ft^3/s June 1, gage height, 5.98 ft; minimum daily discharge, 15 ft^3/s Nov. 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	19	16	18	18	18	20	20	46	23	24	24
2	21	19	16	18	18	18	20	20	23	23	24	24
3	21	19	16	18	18	18	20	20	23	23	24	24
4	21	19	16	18	18	18	20	20	23	23	24	24
5	21	19	16	18	18	18	20	20	22	23	24	24
6	21	19	16	18	18	18	19	20	21	23	24	24
7	20	18	16	18	18	18	20	20	22	23	24	24
8	19	16	16	18	18	18	20	20	22	23	24	24
9	19	16	18	18	18	18	20	20	23	23	24	24
10	19	15	20	18	18	18	19	20	23	23	24	24
11	19	16	20	18	18	18	20	21	23	23	24	24
12	19	15	20	18	18	18	20	21	23	23	24	24
13	19	16	20	18	18	18	20	21	23	23	24	24
14	18	16	18	18	18	18	20	21	23	23	24	24
15	19	16	17	18	18	18	20	21	23	24	24	24
16	19	16	17	18	18	18	20	23	21	24	24	24
17	19	16	18	18	18	18	20	23	23	24	24	24
18	19	16	18	18	18	18	20	23	23	24	24	24
19	19	16	18	18	18	18	20	23	21	24	24	24
20	19	16	18	18	18	18	20	23	23	24	24	24
21	19	16	18	18	18	18	20	23	23	24	24	24
22	19	16	18	18	18	18	20	23	21	24	24	24
23	19	16	18	18	18	19	20	23	23	24	24	24
24	19	16	18	18	18	20	20	23	23	24	24	23
25	19	16	18	18	18	20	20	23	23	24	24	22
26	19	16	18	18	18	20	20	23	23	24	24	22
27	19	16	17	18	18	20	20	23	23	24	24	22
28	19	16	17	18	18	20	20	23	23	24	24	22
29	19	16	17	18	---	20	20	23	23	24	24	22
30	19	16	18	18	---	20	20	23	23	24	24	22
31	19	---	18	18	---	20	---	29	---	24	24	---
TOTAL	601	498	545	558	504	575	598	679	702	730	744	707
MEAN	19.4	16.6	17.6	18.0	18.0	18.5	19.9	21.9	23.4	23.5	24.0	23.6
MAX	21	19	20	18	18	20	20	29	46	24	24	24
MIN	18	15	16	18	18	18	19	20	21	23	24	22
AC-FT	1190	988	1080	1110	1000	1140	1190	1350	1390	1450	1480	1400

CAL YR 1988 TOTAL 28243 MEAN 77.2 MAX 956 MIN 15 AC-FT 56020
WTR YR 1989 TOTAL 7441 MEAN 20.4 MAX 46 MIN 15 AC-FT 14760

06904010 CHARITON RIVER NEAR MOULTON, IA

LOCATION.--Lat 40°41'30", long 92°46'15", in SE1/4 NE1/4 sec.14, T.68N., R.17W., Appanoose County, Hydrologic Unit 10280201, on right bank 6 ft downstream from bridge on county highway J45, 0.7 mi downstream from Hickory Creek, 5.0 mi west of Moulton, 8.0 mi upstream from Iowa-Missouri border, 20.8 mi downstream from Rathbun Dam, and at mile 121.5.

DRAINAGE AREA.--740 mi^2.

PERIOD OF RECORD--August 1979 to current year.

GAGE--Water stage recorder. Datum of gage is 800.00 ft above NGVD (U.S. Army Corps of Engineers bench mark).

REMARKS.--Estimated daily discharges: Dec. 7 to Jan. 17, Feb. 2 to Mar. 19, and April 7-9. Records good except those for estimated daily discharges, which are poor. Flow regulated by Rathbun Reservoir (station 06903880) 20.8 mi upstream. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data. U.S. Army Corps of Engineers rain-gage and satellite data collection platform at station.

AVERAGE DISCHARGE.--10 years, 553 ft^3/s, 10.1 in/yr, 440,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,200 ft^3/s July 16, 1982, gage height, 36.83 ft; minimum daily discharge, 14 ft^3/s June 22-23, 27, and July 9, 1988.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1947 reached a stage of about 45 ft, discharge unknown, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,690 ft^3/s Sept. 9, gage height, 28.13 ft; minimum daily discharge, 16 ft^3/s May 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	26	17	20	21	20	22	26	62	27	19	71
2	26	26	18	20	20	21	23	27	82	26	18	50
3	25	28	18	19	18	22	23	22	76	25	18	44
4	25	27	17	19	20	34	23	22	71	24	20	40
5	25	26	17	19	19	26	23	20	41	23	20	39
6	25	26	17	20	20	20	23	19	31	23	18	37
7	25	26	17	19	21	23	23	18	27	23	20	34
8	25	26	17	18	21	27	23	18	30	22	21	188
9	24	22	17	20	20	35	23	22	40	21	21	2190
10	23	22	22	22	21	42	23	18	35	21	21	1430
11	23	20	26	21	22	30	23	17	47	21	21	360
12	21	20	31	25	20	24	23	19	83	36	21	115
13	19	25	27	23	21	22	22	17	165	27	21	69
14	23	21	23	25	23	28	23	17	214	23	20	56
15	22	28	20	21	21	23	23	16	73	22	20	50
16	23	49	22	28	20	26	23	18	43	23	19	46
17	24	26	24	22	20	23	23	19	34	23	19	45
18	22	19	23	20	19	19	23	29	32	23	19	44
19	19	18	34	28	20	17	23	42	31	23	21	42
20	23	18	29	22	20	27	24	33	26	21	25	37
21	25	17	24	30	21	22	24	25	24	21	23	31
22	26	18	26	27	22	18	23	24	23	20	23	29
23	27	18	23	20	18	18	23	23	21	22	26	28
24	26	17	21	20	19	19	23	136	22	21	33	27
25	26	17	23	20	22	22	23	262	39	20	28	27
26	24	21	21	20	25	23	21	101	49	19	27	27
27	24	26	20	23	21	22	20	51	187	18	36	27
28	25	20	21	22	22	27	21	194	58	18	37	26
29	26	18	20	27	---	27	23	514	35	19	308	25
30	27	18	20	26	---	23	22	161	30	47	329	26
31	27	---	20	23	---	22	---	77	---	25	105	---
TOTAL	751	689	675	689	577	752	682	2007	1731	727	1377	5260
MEAN	24.2	23.0	21.8	22.2	20.6	24.3	22.7	64.7	57.7	23.5	44.4	175
MAX	27	49	34	30	25	42	24	514	214	47	329	2190
MIN	19	17	17	18	18	17	20	16	21	18	18	25
AC-FT	1490	1370	1340	1370	1140	1490	1350	3980	3430	1440	2730	10430

CAL YR 1988 TOTAL 34314 MEAN 93.8 MAX 1200 MIN 14 AC-FT 68060
WTR YR 1989 TOTAL 15917 MEAN 43.6 MAX 2190 MIN 16 AC-FT 31570

Crest-stage partial-record stations

The following table contains annual maximum discharge for crest-stage stations. A crest-stage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained, but is not published herein. The years given in the period of record represent water years up to the current year for which the annual maximum has been determined.

Annual maximum discharge at crest-stage partial-record stations during water year 1989

Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft^3/s)
		Upper Iowa River Basin					
05387500	Upper Iowa River at Decorah, Ia.	Lat 43°18'19", long 91°47'48", in NE1/4 sec. 16, T.98N., R.8 W., Winneshiek County, on right bank 1,200 ft upstream from bridge on U.S. Highway 52 (city route) in Decorah.	511	1951-	03-12-89	6.70	2,240
05388310	Waterloo Creek near Dorchester, Ia.	Lat 43°27'04", long 91°30'18", in NW1/4 sec.25, T.100 N., R.6 W., Allamakee County, on State Highway 76, 1.4 mi south of Dorchester.	43.6	1966-	03-12-89	699.55(b)	(+)
		Wexford Creek Basin					
05388400	Wexford Creek near Harpers Ferry, Ia.	Lat 4°16'22", long 91°08'00", in SE1/4 sec.25, T.98 N., R.3 W., Allamakee County, at bridge, 5 mi north of Harpers Ferry on county highway X52.	11.9	1953-	03-12-89	6.35(b)	(+)
		Turkey River Basin					
05411530	North Branch Turkey River near Cresco, Ia.	Lat 43°22'15", long 92°12'49", in NW1/4 sec.25, T.99 N., R.12.W, Howard County, at bridge on state highway 9, 5 mi west of Cresco.	19.5	1966-	03-12-89	88.06	130
05411700	Crane Creek near Lourdes, Ia.	Lat 43°14'57", long 92°18'32", in SE1/4 NW1/4 sec.6, T.97 N., R.12 W., Howard County, at bridge on State Highway 272, 1 mi southwest of Lourdes.	75.8	1951-	1989	(a)	<210
		Little Maquoketa River Basin					
05414350	Little Maqouketa River near Graf, Ia.	Lat 42°30'09", long 90°51'50", in SE1/4 sec.20, T.89 N., R.1 E., Dubuque County, at bridge on county highway, 300 ft downstream from Illinois Central railroad bridge, 0.5 mi northeast of Graf.	39.6	1951-	1989	(a)	<1,200
05414400	Middle Fork Little Maquoketa River near Rickardsville, Ia.	Lat 42°33'38", long 90°51'35", in SE1/4 sec.32, T.90 N., R.1 E., Dubuque County, at bridge on county highway, 2 mi southeast of Rickardsville.	30.2	1951-	03-13-89	15.77(b)	(+)
05414450	North Fork Little Maquoketa River near Rickardsville, Ia.	Lat 42°35'09", long 90°51'20", near NW corner sec.28, T.90 N., R.1 E., Dubuque County, at bridge on county highway, 1 mi northeast of Rickardsville.	21.6	1951-	03-13-89	6.25(b)	(+)
05414500	Little Maquoketa River near Durango, Ia.	Lat 42°33'18", long 90°44'46", in NW1/4 NE1/4 sec. 5, T.89 N., R.2 E., Dubuque County, on left bank 10 ft upstream from bridge on county highway, 300 ft upstream from Cloie Branch, 1.7 mi east of Durango, 5.6 mi northwest of court house at Dubuque and 6.4 mi upstream from mouth.	130	1934-	03-13-89	11.49(b)	(+)
05414600	Little Maquoketa River tributary at Dubuque, Ia.	Lat 42°32'33", long 90°41'38", near NW corner sec. 11, T.89 N., R.2 E, Dubuque County at bridge on State Highway 386, near north city limits of Dubuque.	1.54	1951-	09-09-89	10.73	122

Annual maximum discharge at crest-stage partial-record stations during water year 1989--Continued

Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft^3/s)
		Maquoketa River Basin					
05417530	Plum Creek at Earlville, Ia.	Lat 42°28'13", long 91°14'53", in NE1/4 sec.1, T.88 N., R.4 W., Delaware County, at bridge on U.S. Highway 20, 1.5 mi southeast of Earlville.	41.1	1966-	03-13-89	86.29(b)	(+)
05417590	Kitty Creek near Langworthy, Ia.	Lat 42°12'04", long 91°12'27", in NW1/4 sec.4, T.85 N., R.3 W., Jones County, at bridge on U.S. Highway 151, 1 mi northeast of Langworthy.	14.4	1966-	03-13-89	85.77(b)	(+)
		Wapsipinicon River Basin					
05420600	Little Wapsipinicon River tributary near Riceville, Ia.	Lat 43°21'31", long 92°29'08", near S1/4 corner sec.27, T.99 N., R.14 W., Howard County, at culvert on county highway, 3.5 mi east of Riceville.	0.90	1953-	1989	(a)	<5
05420620	Little Wapsipinicon River near Acme, Ia.	Lat 43°19'37", long 92°29'07", near N1/4 corner sec.10, T.98 N., R.14 W., Howard County, at bridge on county highway, 1 mi north of Acme.	7.76	1953-	1989	(a)	<92
05420640	Little Wapsipinicon River at Elma, Ia.	Lat 43°14'30", long 92°27'04", in NW1/4 sec.12, T.97 N., R.14 W., Howard County, at bridge on county highway B17, near west city limits of Elma.	37.3	1953-	1989	(a)	<430
05420650	Little Wapsipinicon River near New Hampton, Ia.	Lat 43°03'58", long 92°23'38", in NW1/4 sec.9, T.95 N., R.13 W., Chickasaw County, at bridge on U.S. Highway 18, 4 mi west of New Hampton.	95.0	1966-	1989	(a)	<420
05420690	East Fork Wapsipinicon River near New Hampton, Ia.	Lat 43°05'11", long 92°18'22", in SE1/4 sec.31, T.96 N., R.12 W., Chickasaw County, at bridge on U.S. Highway 63, 2 mi north of New Hampton.	30.3	1966-	1989	(a)	<480
05420850	Little Wapsipinicon River near Oran, Ia.	Lat 42°42'53", long 92°02'29", near NW corner sec.9, T.91 N., R.10 W., Fayette County at bridge on State Highway 3, 2 mi northeast of Oran.	94.1	1966-	03-10-89 09-09-89	85.83(b) 84.63	(+) 430
05420855	Buck Creek near Oran, Ia.	Lat 42°42'53", long 92°07'33", in NE1/4 sec.10, T.91 N., R.11 W., Bremer County, at bridge on State Highway 3, 2.5 mi northwest of Oran.	37.9	1966-	03-10-89	86.98(b)	(+)
05421100	Pine Creek tributary near Winthrop, Ia.	Lat 42°29'17", long 91°47'10", in SW1/4 sec.27, T.89 N., R.8 W., Buchanan County, at culvert on county highway, 2.5 mi northwest of Winthrop.	0.334	1953-	1989	(a)	<10
05421200	Pine Creek near Winthrop, Ia.	Lat 42°28'11", long 91°47'01", in SW/4 sec.34, T.89 N., R.8 W., Buchanan County, at railroad bridge, 500 ft upstream from U.S. Highway 20, and 2.5 mi northwest of Winthrop.	28.3	1950-	1989	(a)	<320
05421300	Pine Creek tributary No. 2 at Winthrop, Ia.	Lat 42°28'06", long 91°44'33", at N1/4 corner sec.2, T.88 N., R.8 W., Buchanan County, at culvert on U.S. Highway 20, near west city limits of Winthrop.	0.704	1953-	09-09-89	6.50	140
05421550	Buffalo Creek above Winthrop, Ia.	Lat 42°29'51", long 91°43'42", near NE corner sec.25, T.89 N., R.8 W., Buchanan County, at bridge on county highway W45, 1.5 mi northeast of Winthrop.	68.2	1957-	03-10-89	16.93(b)	(+)
05421600	Buffalo Creek near Winthrop, Ia.	Lat 42°28'07", long 91°43'04", in NE1/4 sec.1, T.88 N., R.8 W., Buchanan County, at bridge on U.S. Highway 20, 1 mi east of Winthrop.	71.4	1953-	03-10-89	87.33(b)	(+)
05421890	Silver Creek at Welton, Ia.	Lat 41°54'54", long 90°36'00", in NW1/4 sec.15, T.82 N., R.3 E., Clinton County, at bridge on U.S. Highway 61, at north edge of Welton.	9.03	1966-	1989	(a)	<270

Annual maximum discharge at crest-stage partial-record stations during water year 1989--Continued

Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft^3/s)
		Iowa River Basin					
05448400	Westmain drainage ditch 1 & 2 near Britt, Ia.	Lat 43°06’09", long 93°47’04", in SW1/4 sec.27, T.96 N., R.25 W., Hancock County, at bridge on U.S. Highway 18, near east city limits of Britt.	21.2	1966-	1989	(a)	<53
05448600	East Branch Iowa River above Hayfield, Ia.	Lat 43°09’21", long 93°41’21", near S1/4 corner sec.4, T.96 N., R.24 W., Hancock County, at bridge on county highway, 1.5 mi southeast of Hayfield.	2.23	1953-	1989	(+)	(+)
05448700	East Branch Iowa River near Hayfield, Ia.	Lat 43°10’50", long 93°39’20", in NW1/4 sec.35, T.97 N., R.24 W., Hancock County, at bridge on county highway B20, 2 mi east of Hayfield.	7.94	1952-	1989	(a)	(+)
05448800	East Branch Iowa River near Garner, Ia.	Lat 43°06’17", long 93°37’20", near center sec.25, T.96 N., R.24 W., Hancock County, at bridge on U.S. Highway 18, 1.2 mi west of Garner.	45.1	1952-	1989	(a)	(+)
05448900	East Branch Iowa River tributary near Garner, Ia.	Lat 43°06’18", long 93°39’29", near E1/4 corner sec.27, T.96 N., R.24 W., Hancock County, at culvert on U.S. Highway 18, 2.1 mi west of Garner.	5.98	1952-	1989	(a)	(+)
05451955	Stein Creek near Clutier, Ia.	Lat 42°04’46", long 92°18’00", in NE1/4 sec.24, T.84 N., R.13 W., Tama County, at bridge on State Highway 318, 5 mi east of Clutier.	23.4	1971-	03-10-89 05-24-89	72.38(b) 71.12	300 320
05453200	Price Creek at Amana, Ia.	Lat 41°48’18", long 91°52’23", in SE1/4 sec.22, T.81 N., R.9 W., Iowa County, at bridge on State Highway 149, near north edge of Amana.	29.1	1966-	09-08-89	84.98	(+)
05453600	Rapid Creek below Morse, Ia.	Lat 41°43’45", long 91°25’38", near NE corner sec.21, T.80 N., R.5 W., Johnson County, at bridge on county highway, 1.5 mi southeast of Morse.	8.12	1951-	03-09-89	17.57(b)	(+)
05453750	Rapid Creek southwest of Morse, Ia.	Lat 41°43’23", long 91°26’16", in W1/2 sec. 21, T.80 N., R.5 W., Johnson County, at bridge on county highway, 2 mi southwest of Morse.	15.2	1951-	03-09-89	22.28(b)	(+)
05453850	Rapid Creek tributary No. 3 near Oasis, Ia.	Lat 41°42’33", long 91°27’14", near center sec. 29, T.80 N., R.5 W., Johnson County, at bridge on county highway, 3.5 mi west of Oasis.	1.62	1951-	1989	(a)	(+)
05453900	Rapid Creek tributary near Oasis, Ia.	Lat 41°41’14", long 91°26’37", near SW corner sec.33, T.80 N., R.5 W., Johnson County, at bridge on county highway X16, 3 mi southwest of Oasis.	0.97	1951-	1989	(a)	(+)
05453950	Rapid Creek tributary near Iowa City, Ia.	Lat 41°41’56", long 91°28’39", in NW1/4 sec.31, T.80 N., R.5 W., Johnson County, at bridge on county highway, 4 mi northeast of Iowa City.	3.43	1951-	1989	(a)	(+)
05455140	North English River near Montezuma, Ia.	Lat 41°38’45", long 92°34’20", in SW1/4 sec.14, T.79 N., R.15 W., Poweshiek County, at bridge on county highway, 5.0 mi northwest of Montezuma.	31.0	1972-	1989	(a)	(+)
05455200	North English River near Guernsey, Ia. (discontinued)	Lat 41°38’47", long 92°23’47", near SW corner sec.17, T.79 N., R.13 W., Poweshiek County, at bridge on county highway V21, 2.2 mi west of Guernsey.	68.7	1953-	1989	(+)	(+)
05455210	North English River at Guernsey, Ia.	Lat 41°38’42", long 92°21’28", at NW corner sec.22, T.79 N., R.13 W., Poweshiek County at bridge on State Highway 21, 1 mi southwest of Guernsey.	81.5	1960, 1966-	1989	(a)	<2,000

Annual maximum discharge at crest-stage partial-record stations during water year 1989--Continued

					Annual maximum		
Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Gage height (feet)	Discharge (ft^3/s)
		Iowa River Basin--Continued					
05455230	Deep River at Deep River, Ia.	Lat 41°35'29", long 92°21'18", in SW1/4 sec.3, T.78 N., R.13 W., Poweshiek County, at bridge on State Highway 21, 1 mi northeast of Deep River.	30.5	1960, 1966-	09-08-89	79.77	(+)
05455300	South English River near Barnes City, Ia. (discontinued)	Lat 41°31'26", long 92°27'56", near NW corner sec.34, T.78 N., R.14 W., Poweshiek County, at bridge on county highway, 1 mi north of Barnes City.	11.5	1953-	1989	(+)	(+)
05455550	Bulgers run near Riverside, Ia.	Lat 41°29'02", long 91°37'36", in SE1/4 sec.11, T.77 N., R.7 W., Washington County, at bridge on State Highway 22, 2.5 mi west of Riverside.	6.31	1965-	06-01-89	85.60	(+)
05457440	Deer Creek near Carpenter, Ia.	Lat 43°24'34", long 92°59'05", at NW corner sec.9, T.99 N., R.18 W., Mitchell County, at bridge on State Highway 105, 1.5 mi east of Carpenter.	91.6	1966-	1989	(a)	<1,450
05458560	Beaverdam Creek near Sheffield, Ia.	Lat 42°56'11", long 93°12'09", at NW corner sec.27, T.94 N., R.20 W., Cerro Gordo County, at bridge on U.S. Highway 65, 3 mi north of Sheffield.	123	1966-	1989	(a)	<650
05459010	Elk Creek at Kensett, Ia.	Lat 43°22'18", long 93°12'37", in NE1/4 sec.28, T.99 N., R.20 W., Worth County, at bridge on U.S. Highway 65, 1 mi north of Kensett.	58.1	1966-	1989	(a)	<180
05459490	Spring Creek near Mason City, Ia.	Lat 43°12'48", long 93°12'38", in SE1/4 sec.16, T.97 N., R.20 W., Cerro Gordo County, at bridge on U.S. Highway 65, 4 mi north of Mason City.	29.3	1966-	1989	(a)	<115
05460100	Willow Creek near Mason City, Ia.	Lat 43°08'55", long 93°16'07", near center sec.12, T.96 N., R.21 W., Cerro Gordo County, at bridge on U.S. Highway 18, 3.5 mi west of Mason City.	78.6	1966-	03-14-89	89.01	415
05462750	Beaver Creek tributary near Aplington, Ia.	Lat 42°34'40", long 92°50'49", in NW1/4 sec.27, T.90 N., R.17 W., Butler County, at bridge on U.S. Highway 20, 2 mi east of Aplington.	11.6	1966-	1989	(a)	<100
05463090	Black Hawk Creek at Grundy Center, Ia.	Lat 42°22'10", long 92°46'05", in NW1/4 sec.7, T.87 N., R.16 W., Grundy County, at bridge on State Highway 14, at north edge of Grundy Center.	56.9	1966-	1989	(a)	<78
05464145	Twelve Mile Creek near Traer, Ia.	Lat 42°13'50", long 92°27'56", in SE1/4 sec.27, T.86 N., R.14 W., Tama County, at bridge on U.S. Highway 63, 2.5 mi north of Traer.	43.8	1966-	03-10-89	85.84(b)	(+)
05464310	Pratt Creek near Garrison, Ia.	Lat 42°10'53", long 92°11'10", in SE1/4 sec.12, T.85 N., R.12 W., Benton County at bridge on U.S. Highway 218, 3.5 mi northwest of Garrison.	23.4	1966-	c1988 1989	(a) (a)	<740 <740
05464318	East Blue Creek at Center Point, Ia.	Lat 42°12'44", long 91°47'21", in SW1/4 sec.33, T.86 N., R.8 W., Linn County, at bridge on State Highway 150, 1.5 mi north of Center Point.	17.6	1966-	1989	(a)	(+)
05464880	Otter Creek at Wilton, Ia.	Lat 41°36'17", long 91°02'08", in NE1/4 sec.35, T.79 N., R.2 W., Cedar County, at bridge on State Highway 38, 1.5 mi northwest of Wilton.	10.7	1966-	1989	(a)	(+)
05465150	North Fork Long Creek at Ainsworth, Ia.	Lat 41°16'51", long 91°32'16", in SW1/4 sec.22, T.75 N., R.6 W., Washington County, at bridge on U.S. Highway 218, 1 mi southeast of Ainsworth.	30.2	1951, 1965-	09-02-89	66.03	270

Annual maximum discharge at crest-stage partial-record stations during water year 1989--Continued

Station no.	Station name	Location	Drainage area (mi²)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft³/s)
		Skunk River Basin					
05469860	Mud Lake drainage ditch 71 in Jewell, Ia.	Lat 42°18'52", long 93°38'23", in SW1/4 sec.27, T.87 N., R.24 W., Hamilton County, at bridge on U.S. Highway 69, in Jewell.	65.4	1966-	1989	(a)	<270
05469990	Keigley Branch near Story City, Ia.	Lat 42°09'01", long 93°37'13", in NW1/4 sec.26, T.85 N., R.24 W., Story County, at bridge on U.S. Highway 69, 3 mi south of Story City.	31.0	1966-	1989	(a)	<245
05472090	North Skunk River near Baxter, Ia.	Lat 41°49'13", long 93°03'41", in NE1/4 sec.21, T.81 N., R.19 W., Jasper County, at bridge on State Highway 223, 4.5 mi east of Baxter.	52.2	1966-	1989	(a)	<840
05472290	Sugar Creek near Searsboro, Ia. (discontinued)	Lat 41°34'26", long 92°44'20", at E1/4 corner sec.7, T.78 N., R.16 W., Poweshiek County, at bridge on State Highway 225, 1.8 mi west of Searsboro.	52.7	1966-	1989	(+)	(+)
05472390	Middle Creek near Lacey, Ia.	Lat 41°25'17", long 92°39'04", near N1/4 corner sec.1, T.76 N., R.16 W., Mahaska County, at bridge on U.S. Highway 63, 1.5 mi northwest of Lacey.	23.0	1966-	05-24-89	86.54	1,060
05472445	Rock Creek at Sigourney, Ia. (discontinued)	Lat 41°20'12", long 92°13'20", in NE1/4 sec.3, T.75 N., R.12 W., Keokuk County, at bridge on State Highway 92, near west edge of Sigourney.	26.3	1966-	1989	(+)	(+)
05473300	Cedar Creek near Batavia, Ia. (discontinued)	Lat 41°00'34", long 92°07'06", in SW1/4 sec.27, T.72 N., R.11 W., Jefferson County, at bridge on U.S. Highway 34, 2.5 mi northeast of Batavia.	252	1966-	1989	(+)	(+)
		Des Moines River Basin					
05480930	White Fox Creek at Clarion, Ia.	Lat 42°43'55", long 93°42'26", in NW1/4 sec.5, T.91 N., R.24 W., Wright County, at bridge on State Highway 3, 1.5 mi east of Clarion.	13.3	1966-	1989	(a)	<68
05481510	Bluff Creek at Pilot Mound, Ia.	Lat 42°09'59", long 94°01'15", in NW 1/4 sec.20, T.85 N., R.27 W., Boone County, at bridge on State Highway 329, at northwest edge of Pilot Mound.	23.5	1966-	1989	(a)	<250
05481680	Beaver Creek at Beaver, Ia.	Lat 42°02'04", long 94°08'46", in NE1/4 sec.6, T.83 N., R.28 W., Boone County, at bridge on U.S. Highway 30, at southwest edge of Beaver.	38.5	1966-	1989	(a)	<120
05481690	West Beaver Creek at Grand Junction, Ia.	Lat 42°01'56", long 94°12'38", in NE1/4 sec.3, T.83 N., R.29 W., Greene County, at bridge on U.S. Highway 30, near east edge of Grand Junction.	12.6	1966-	1989	(a)	<67
05482600	Hardin Creek at Farnhamville, Ia.	Lat 42°16'01", long 94°25'10", near NE corner sec.14, T.86 N., R.31 W., Calhoun County, at bridge on State Highway 175, near west city limits of Farnhamville.	43.7	1952-	1989	(a)	<87
05482800	Happy Run at Churdan, Ia.	Lat 42°10'16", long 94°29'39", in SW1/4 sec.17, T.85 N., R.31 W., Greene County, at bridge on county highway, 1 mi northwest of Churdan.	7.58	1952-	1989	(a)	<25
05482900	Hardin Creek near Farlin, Ia.	Lat 42°05'34", long 94°25'39", near N1/4 corner sec.14, T.84 N., R.31 W., Greene County, at bridge on county highway, 1.5 mi northeast of Farlin.	101	1951-	1989	(a)	<430
05483318	Brushy Fork Creek near Templeton, Ia.	Lat 41°56'45", long 94°52'45", in NW1/4 sec.1, T.82 N., R.35 W., Carroll County, at bridge on U.S. Highway 71, 4 mi northeast of Templeton.	45.0	1966-	07-08-89	78.43	(+)
05483349	Middle Raccoon River tributary at Carroll, Ia.	Lat 42°02'30", long 94°52'43", in NW1/4 sec.36, T.84 N., R.35 W., Carroll County, at bridge on U.S. Highway 71, 1.5 mi south of Carroll.	6.58	1966-	1989	(+)	(+)

Annual maximum discharge at crest-stage partial-record stations during water year 1989--Continued

Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum		
					Date	Gage height (feet)	Discharge (ft^3/s)
		Des Moines River Basin--Continued					
05487350	South Otter Creek tributary near Woodburn, Ia.	Lat 41°02'48", long 93°35'26", near SW corner sec.11, T.72 N., R.24 W., Clarke County, at bridge on county highway, 2 mi north of Woodburn.	0.71	1955-	1989	(+)	(+)
05487800	White Breast Creek at Lucas, Ia.	Lat 41°01'24", long 93°27'56", in NE1/4 sec.23, T.72 N., R.23 W., Lucas County, at bridge on U.S. Highway 65, near south city limits of Lucas.	128	1953-	1989	(+)	(+)
05488620	Coal Creek near Albia, Ia.	Lat 41°01'02", long 92°50'46", in SW1/4 sec.20, T.72 N., R.17 W., Monroe County, at bridge on U.S. Highway 34, 2 mi southwest of Albia.	13.5	1966-	09-09-89	80.19	980
05489150	Little Muchakinock Creek at Oskaloosa, Ia. (discontinued)	Lat 41°15'58", long 92°38'33", in SE1/4 sec.25, T.75 N., R.16 W., Mahaska County, at bridge on State Highway 137, at south edge of Oskaloosa.	9.12	1966-	1989	(+)	(+)
05489350	South Avery Creek near Blakesburg, Ia.	Lat 41°00'59", long 92°37'32", in SE1/4 sec.19, T.72 N., R.15 W., Wapello County, at bridge on U.S. Highway 34, 3.5 mi north of Blakesburg.	33.1	1965-	09-09-89	82.69	3,300
05489490	Bear Creek at Ottumwa, Ia.	Lat 41°00'43", long 92°27'54", in NW1/4 sec.27, T.72 N., R.14 W., Wapello County, at bridge on U.S. Highway 34, near west edge of Ottumwa.	22.9	1965-	09-09-89	86.77	1,900
		Fox River Basin					
05494110	South Fox Creek near West Grove, Ia.	Lat 40°43'31", long 92°36'16", in SE1/4 sec.32, T.69 N., R.15 W., Davis County, at bridge on State Highway 2, 2.4 mi west of West Grove.	12.2	1965-	1989	(a)	(+)
		Big Sioux River Basin					
06483410	Otter Creek north of Sibley, Ia. (discontinued)	Lat 43°27'41", long 95°44'29", at NE corner sec.25, T.100 N., R.42 W., Osceola County, at bridge on county highway L40, 4 mi north of Sibley.	11.9	1952-	1989	(+)	(+)
06483430	Otter Creek at Sibley, Ia. (discontinued)	Lat 43°24'14", long 95°46'10", near N1/4 corner sec.14, T.99 N., R.42 W., Osceola County, at bridge on county highway A22, 1 mi northwest of Sibley.	29.9	1952-	1989	(+)	(+)
06483440	Dawson Creek near Sibley, Ia.	Lat 43°23'23", long 95°42'53", near NW corner sec.20, T.99 N., R.41 W., Osceola County, at culvert on county highway A30, 2 mi southeast of Sibley.	4.35	1952-	05-24-89	4.87	(+)
06483460	Otter Creek near Ashton, Ia. (discontinued)	Lat 43°20'07", long 95°45'43", in SE1/4 sec.2, T.98 N., R.42 W., Osceola County, at bridge on county highway L36, 2 mi northeast of Ashton.	88.0	1952-	1989	(+)	(+)
06483495	Burr Oak Creek near Perkins, Ia.	Lat 43°14'43", long 96°10'38", in SE1/4 sec.5, T.97 N., R.45 W., Sioux County, at bridge on U.S. Highway 75, 4 mi north of Perkins.	30.9	1966-	03-12-89	85.66(b)	(+)
		Perry Creek Basin					
06599800	Perry Creek near Merrill, Ia.	Lat 42°43'16", long 96°20'33", in NW1/4 sec.12, T.91 N., R.47 W., Plymouth County, at bridge on county highway C44, 5 mi west of Merrill.	8.17	1953-	03-09-89	7.19	(+)
06599950	Perry Creek near Hinton, Ia.	Lat 42°37'57", long 96°22'13", in NE1/4 sec.15, T.90 N., R.47 W., Plymouth County, at bridge on county highway, 4 mi west of Hinton.	30.8	1953-	1989	(+)	(+)

Annual maximum discharge at crest-stage partial-record stations during water year 1989--Continued

					Annual maximum		
Station no.	Station name	Location	Drainage area (mi^2)	Period of record	Date	Gage height (feet)	Discharge (ft^3/s)
Floyd River Basin							
06600030	Little Floyd River near Sanborn, Ia.	Lat 43°11'10", long 95°43'30", in NE1/4 sec.31, T.97 N., R.41 W., O'Brien County, at bridge on U.S. Highway 18, 3.5 mi west of Sanborn.	8.44	1966-	1989	(a)	(+)
Monona-Harrison Ditch Basin							
06601480	Big Whiskey Slough near Remsen, Ia.	Lat 42°48'28", long 95°53'21", in NW1/4 sec.11, T.92 N., R.43 W., Plymouth County, at bridge on State Highway 3, 4.2 mi east of Remsen.	12.9	1966-	03-10-89	92.48(b)	(+)
06602190	Elliott Creek at Lawton, Ia.	Lat 42°28'30", long 96°11'22", in NW1/4 sec.3, T.88 N., R.46 W., Woodbury County, at bridge on U.S. Highway 20, at west edge of Lawton.	34.8	1966-	09-07-89	82.47	2,100
Little Sioux River Basin							
06604510	Ocheyedan River near Ocheyedan, Ia.	Lat 43°25'58", long 95°36'41", in NE1/4 sec.6, T.99 N., R.40 W., Osceola County, at bridge on State Highway 9, 4 mi northwest of Ocheyedan.	73.5	1966-	1989	(a)	(+)
06605340	Prairie Creek near Spencer, Ia.	Lat 43°05'16", long 95°09'40", in SE1/4 sec. 36, T.96 N., R.37 W., Clay County, at bridge on U.S. Highway 71, 4 mi south of Spencer.	22.3	1966-	1989	(a)	<160
06605750	Willow Creek near Cornell, Ia.	Lat 42°58'21", long 95°09'40", in SE1/4 sec. 12, T.94 N., R.37 W., Clay County, at bridge on U.S. Highway 71, 2 mi northwest of Cornell.	78.6	1966-	1989	(a)	<340
06605890	Waterman Creek at Hartley, Ia.	Lat 43°11'06", long 95°30'43", in NE1/4 sec.36, T.97 N., R.40 W., O'Brien County, at bridge on U.S. Highway 18, 1.8 mi west of Hartley.	28.7	1966-	03-08-89	84.33(b)	(+)
06606790	Maple Creek near Alta, Ia.	Lat 42°44'56", long 95°22'16", in NE1/4 sec. 31, T. 92 N., R.38 W., Buena Vista County, at bridge on State Highway 3, 6 mi northwest of Alta.	15.5	1966-	1989	(a)	<32
06607197	Simmons Creek near Mapleton, Ia.	Lat 42°10'09", long 95°48'42", in SE1/4 sec.14, T.85 N., R.43W., Monona County, at bridge on county road E16, 1 mi west, of Mapleton.		1989-	05-29-89	16.23	(+)
Soldier River Basin							
06608450	Jordan Creek at Moorhead, Ia.	Lat 41°54'59", long 95°51'33", in NW1/4 sec.16, T.82 N., R.43 W., Monona County, at bridge on State Highway 183, at southwest corner of Moorhead.	30.1	1966-	1989	(a)	(+)
Boyer River Basin							
06609560	Willow Creek near Soldier, Ia.	Lat 41°55'17", long 95°42'05", near S1/4 corner sec.11, T.82 N., R.42 W., Monona County, at bridge on State Highway 37, 6 mi southeast of Soldier.	29.1	1966-	1989	(+)	(+)
Mosquito Creek Basin							
06610510	Moser Creek near Earling, Ia.	Lat 41°46'35", long 95°26'55", in NE1/4 sec.1, T.80 N., R.40 W., Shelby County, at bridge on State Highway 37, 1.5 mi west of Earling.	21.6	1966-	09-08-89	82.75	5,300
06610600	Mosquito Creek at Neola, Ia.	Lat 41°26'36", long 95°36'42", in NE1/4 sec.25, T.77 N., R.42 W., Pottawattamie County, at bridge on county highway, 0.5 mi south of Neola. Prior to 04-19-63, gage located 0.9 miles upstream D.A. 128 mi^2.	131	1952-	09-08-89	26.64	7,900
Nishnabotna River Basin							
06807418	Graybill Creek near Carson, Ia.	Lat 41°13'57", long 95°22'51", in NW1/4 sec.7, T.74 N., R.39 W., Pottawattamie County, at bridge on State Highway 92, 2 mi east of Carson.	45.9	1966-	1989	(a)	(+)

Annual maximum discharge at crest-stage partial-record stations during water year 1989--Continued

Station no.	Station name	Location	Drainage area (mi²)	Period of record	Annual maximum Date	Annual maximum Gage height (feet)	Annual maximum Discharge (ft³/s)
		Nishnabotna River Basin--Continued					
06807470	Indian Creek near Emerson, Ia.	Lat 41°01'50", long 95°22'51", in NW1/4 sec.19, T.72 N., R.39 W., Montgomery County, at bridge on U.S. Highway 34, 1 mi east of Emerson.	37.3	1966-	09-08-89	88.09	1,740
06807720	Middle Silver Creek near Avoca, Ia. (discontinued)	Lat 41°28'33", long 95°28'06", near N1/4 corner sec.17, T.77 N., R.40 W., Pottawattamie County, at bridge on State Highway 83, 7 mi west of Avoca.	3.21	1955-	1989	(+)	(+)
06807760	Middle Silver Creek near Oakland, Ia.	Lat 41°19'28", long 95°33'19", near E1/4 corner sec. 4, T.75., R.41 W., Pottawattamie County, at bridge on county highway, 8.5 mi northwest of Oakland.	25.7	1953-	09-08-89	11.53	950
06807780	Middle Silver Creek at Treynor, Ia.	Lat 41°14'37", long 95°36'53", near NE corner sec. 1, T.74 N., R.42 W., Pottawattamie County, at bridge on county highway L55, 1 mi north of Treynor.	42.7	1953-	09-08-89	5.75	1,100
06808880	Bluegrass Creek at Audubon, Ia.	Lat 41°42'46", long 94°55'43", in NW1/4 sec.28, T.80 N., R.35 W., Audubon County, at bridge on U.S. Highway 71, near south edge of Audubon.	15.4	1966-	09-08-89	83.61	(+)
		Tarkio River Basin					
06811760	Tarkio River near Elliot, Ia.	Lat 41°06'06", long 95°06'09", near NE corner sec.28, T.73 N., R.37 W., Montgomery County, at bridge on county highway, 4.5 mi southeast of Elliot.	10.7	1952-	09-08-89	10.32	(+)
06811800	East Tarkio Creek near Stanton, Ia.	Lat 41°04'48", long 95°05'34", in W1/2 sec. 34, T.73 N., R.37 W., Montgomery County, at bridge on county highway H24, 7 mi north of Stanton.	4.66	1952-	09-08-89	7.92	510
06811820	Tarkio River tributary near Stanton, Ia.	Lat 41°02'38", long 95°05'55", near NE corner sec.16, T.72 N., R.37 W., Montgomery County, at box culvert on county highway H63, 4 mi north of Stanton.	0.67	1952-	1989	(+)	(+)
06811875	Snake Creek near Yorktown, Ia.	Lat 40°44'33", long 95°07'46", in NW1/4 sec.32, T.69 N., R.37 W., Page County, at bridge on State Highway 2, 1.5 mi northeast of Yorktown.	9.10	1966-	09-08-89	91.62	1,700
		Nodaway River Basin					
06816290	West Nodaway River at Massena, Ia.	Lat 41°14'44", long 94°45'27", in E1/2 sec.33, T.75 N., R.34 W., Cass County, at bridge on State Highway 148, at southeast corner of Massena.	23.4	1966-	09-08-89	79.62	2,450
		Platte River Basin					
06818598	Platte River near Stringtown, Ia. (discontinued)	Lat 40°58'44", long 94°29'39", in SE1/4 sec.2, T.71 N., R.32 W., Adams County, at bridge on U.S. Highway 34, 3.8 mi east of Stringtown.	51.7	1966-	1989	(+)	(+)
06819110	Middle Branch 102 River near Gravity, Ia.	Lat 40°49'40", long 94°44'18", in SE1/4 sec.27, T.70 N., R.34 W., Taylor County, at bridge on State Highway 148, 4.8 mi north of Gravity.	33.5	1966-	09-09-89	80.78	4,600
		Chariton River Basin					
06903980	Chariton River near Udell, Ia	Lat 40°46'53", long 92°50'12", in NE1/4 sec. 17, T.69 N., R.17 W., Appanoose County, at bridge on county highway 5.0 mi west of Udell.	631	1972-	1989	(a)	(+)
06903990	Cooper Creek at Centerville, Ia.	Lat 40°45'02", long 92°51'36", in NW1/4 sec. 30, T.69 N., R.17 W., Appanoose County, at bridge on State Highway 5, at north edge of Centerville.	47.8	1966-	05-29-89	68.34	345

+ Not determined.
a Peak stage did not reach bottom of gage.
b Ice affected.
c Revised.
< Less than.

Discharge measurements in the following table were made at special study and miscellaneous sites throughout the Roberts Creek Basin (tributary to the Turkey River Basin).

Stream	Location	Drainage area (mi^2)	Period of Record	Measurements Date	Measurements Discharge (ft^3/s)
	Roberts Creek Basin				
Hatchery Creek	Lat 42°57'34", Long 91°30'12" in SW 1/4 NW1/4 sec. 13, T.94 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.8 mi S of county road B60, 1.0 mi SE of Gunder	1.28	1988-89	08-17-89	0.09
Hatchery Creek	Lat 42°56'47", long 91°28'59", in NW1/4 NW1/4 sec. 19, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060006, at bridge on farm road 0.9 mi SW of county road B60, approximately 2.5 mi SE of Gunder.	2.84	1988-89	08-17-89	0.01
Hatchery Creek	Lat 42°56'29", long 91°27'37", in NE1/4, SW1/4 sec. 20, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.6 mi S of county road B60, approximately 2 mi N of Big Spring.	1.36	1988-89	08-17-89	0.08
Hatchery Creek	Lat 42°56'06", long 91°28'06", in NW1/4 NW1/4 sec. 29, T.94 N., R.5 W., Clayton County, Hydrologic Unit 070600004, at culvert under towship road 1.3 mi S of county road B60, 1.7 mi N of Big Spring.	1.85	1988-89	08-17-89	0.03
Hatchery Creek	Lat 42°55'36", long 91°28'06", in NE1/4 SE1/4 sec. 30, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 2.25 mi W of county road X16, 1.2 mi N of Big Spring.	7.02	1988-89	08-17-89	0.13
Hatchery Creek	Lat 42°54'46", long 91°28'53", in NE1/4 SW1/4 sec. 31, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on Dept. of Natural Resources hatchery road 0.25 mi SE of township road, 0.6 mi W of Big Spring.	8.80	1988-89	08-17-89	0.00
Roberts Creek	Lat 43°03'27", long 91°34'40", in NE1/4 SE1/4 sec. 8, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road W62, 1.75 mi S of Postville.	2.28	1988-89	08-16-89	0.01
West Branch Roberts Creek	Lat 43°02'44", long 91°33'00", in SE1/4 NE1/4 sec. 16, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at mouth 0.1 mi upstream of county road W64, 3.0 mi SE of Postville	4.14	1988-89	08-16-89	0.31
Roberts Creek	Lat 43°02'40", long 91°32'53", in SE1/4 NE1/4 sec. 16, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road W64 1.5 mi S of State Highway 52, 3.0 mi SE of Postville.	11.1	1988-89	08-16-89	0.91
Roberts Creek	Lat 43°02'11", long 91°32'16", in SW1/4 SE1/4 sec. 15, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road 0.5 mi E of county W64, approximately 3.75 mi SE of Postville.	13.2	1988-89	07-05-89 08-16-89	0.67 1.0
Roberts Creek	Lat 43°00'57", long 91°30'42", in SE1/4 NW1/4 sec. 25, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road 2.0 mi E of county road W64, 4.4 mi SW of Luana.	15.9	1988-89	08-16-89	0.57
Roberts Creek	Lat 42°59'08", long 91°30'02", in SE1/4 NW1/4 sec. 1, T.94 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road B58, 1.0 mi NE of Gunder.	18.2	1988-89	07-07-89 08-16-89	0.94 1.1
Deer Creek	Lat 43°00'04", long 91°32'54", in NE1/4 SE1/4 sec. 28, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on country road B54, 5 mi south of Postville.	1.11	1988-89	01-04-89 02-02-89 03-07-89 03-10-89 03-12-89 04-03-89 05-02-89	0.22 0.24 0.31 3.8 6.4 0.32 0.25

Stream	Location	Drainage area (mi^2)	Period of Record	Measurements	
				Date	Discharge (ft^3/s)
	Roberts Creek Basin--Continued				
Deer Creek	Lat 42°59'08", long 91°30'25",in SW1/4 NW1/4 sec. 1, T.94 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road B58, 0.3 mi upstream of mouth, 1.0 mi N of Gunder.	5.56	1988-89	07-07-89 08-16-89	0.08 0.08
Roberts Creek	Lat 42°58'30", long 91°28'58", in NE1/4 NW1/4 sec. 7, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road, 0.8 mi NE from county road B60, approximately 1.5 mi E of Gunder	26.0	1988-89	08-16-89	1.2
Roberts Creek	Lat 42°58'06", long 91°28'05", in SW1/4 SW1/4 sec. 8, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on dead end township road 4.0 mi N of Big Spring.	28.8	1988-89	08-16-89	1.1
Roberts Creek	Lat 42°57'35", long 91°27'22", in SW1/4 NE1/4 sec. 17, T.94 N., R.5 °., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.7 mi N of county road B60, 3.0 mi NE of Big Spring.	30.4	1988-89	08-16-89	0.74
East Fork Silver Creek	Lat 43°02'40", long 91°26'20", in NW1/4 SE1/4 sec. 16, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at box culvert on township road 2.0 mi W of State Highway 52 and 18, approximately 2.5 mi W of Monona.	3.05	1988-89	08-16-89	0.08
East Fork Silver Creek	Lat 43°02'40", long 91°26'06", in NE1/4 SW1/4 sec. 16, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at steel culvert on township road 2.2 mi W of State Highway 52 and 18, 2.7 mi W of Monona.	0.28	1988-89	08-16-89	1.0
East Fork Silver Creek	Lat 43°02'03", long 91°27'30", in NW1/4 NE1/4 sec. 20, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road X16, 1.4 mi N of county road, 1.8 mi S of Luana.	4.28	1988-89	08-05-89 08-16-89	1.3 1.0
Unnamed Creek (05412070)	Lat 43°02'24", long 91°28'07", in SE1/4 sec.18, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank at culvert on the north-south gravel road between county road W70 and county road X16, 0.8 mi S of State Highway 52 and 18 and approximately 1.6 mi S of Luana.	1.15	1986-89	08-18-89	0.00
East Fork Silver Creek	Lat 43°00'54", long 91°27'30", in NE1/4 SW1/4 sec. 29, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at box culvert on county road B56 0.56 mi upstream from mouth, 3.1 mi S of Luana.	9.5	1988-89	08-16-89	0.00
Silver Creek	Lat 43°02'10", long 91°30'33", in SE1/4 SE1/4 sec. 14, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 2.0 mi E of county road W64, 3.3 mi SW of Luana.	1.36	1988-89	08-17-89	0.00
Silver Creek	Lat 43°02'01", long 91°29'49", in SW1/4 SE1/4 sec. 13, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.5 mi W of county road W70, 2.75 mi SW of Luana.	0.70	1988-89	08-17-89	0.00
Silver Creek (05412060)	Lat 43°01'19", long 91°29'21", in NE1/4 sec. 25, T.95 N., R.6 W., Clayton County, Hydrologic Unit 07060004, on right upstream bank of bridge on county road W70, 2.3 mi S of State Highway 52 and 18, 3.2 mi S of Luana.	4.39	1986-89	08-17-89	0.05
Silver Creek	Lat 43°00'49", long 91°27'44", in NE1/4 SW1/4 sec. 29, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at concrete box culvert on county road B56, 3.2 mi S of Luana.	5.59	1988-89	08-17-89	0.06

Stream	Location	Drainage area (mi²)	Period of Record	Measurements Date	Measurements Discharge (ft³/s)
	Roberts Creek Basin--Continued				
Silver Creek	Lat 43°00'02", long 91°26'53", in SW1/4 NW1/4 sec. 33, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.5 mi W of county road X16, 3.8 mi NE of Gunder.	17.3	1988-89	08-16-89	0.00
Silver Creek	Lat 43°01'40", long 91°25'10", in NW1/4 SE1/4 sec. 22, T.95 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at steel culvert on township road 2.1 mi SE of Monona, 2.9 mi N of county road B58.	1.13	1988-89	08-16-89	0.00
Silver Creek	Lat 42°59'16", long 91°27'12", in SW1/4 NE1/4 sec. 5, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on towship road 0.75 mi W of county road X16, 3.2 mi NE of Gunder.	25.2	1988-89	08-16-89	0.01
Silver Creek	Lat 42°58'24", long 91°26'30", in SE1/4 NW1/4 sec. 9, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.15 mi W of county road X16, 3.0 mi E of Gunder.	8.8	1988-89	07-07-89 08-16-83	0.00 0.00
Roberts Creek	Lat 42°57'36", long 91°26'03", in SE1/4 NW1/4 sec. 16, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road X16, 0.8 mi N of county road B60, 3.8 mi NE of Big Sprin	61.8	1988-89	05-01-89 05-18-89 06-06-89 06-27-89 07-24-89 08-01-89 08-16-89 09-06-89	6.2 2.8 1.9 3.3 0.91 0.81 0.48 2.1
Roberts Creek	Lat 42°57'33", long 91°25'10", in SW1/4 NE1/4 sec. 15, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on township road 0.9 mi N of county road B60, 2.7 mi NW of St. Olaf.	63.6	1988-89	08-16-89	0.20
Roberts Creek	Lat 42°57'06", long 91°24'34", in SW1/4 SW1/4 sec. 14, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road B60, 2.6 mi W of Farmersburg.	64.3	1988-89	08-16-89	0.27
Roberts Creek	Lat 42°57'24", long 91°23'58", in NE1/4 SW1/4 sec. 14, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on farm road 1000 ft S of county road B60, 1.8 mi W of Farmersburg.	65.2	1988-89	08-16-89	0.00
Roberts Creek	Lat 42°56'41", long 91°22'26", in SE1/4 NW1/4 sec. 24, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, under high voltage power line 1000 ft W of township road, 1.0 mi SW of Farmersburg.	66.6	1988-89	08-16-89	0.00
Roberts Creek	Lat 42°57'10", long 91°23'28", in SE1/4 SE1/4 sec. 14, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on private property 1.7 mi N of St. Olaf.	66.0	1988-89	08-16-89	0.00
Roberts Creek (05412100)	Lat 42°55'49", long 91°23'03", in NW1/4 sec. 25, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, on left downstream bank at bridge on road X28, 0.1 mi N of county road B65, on north edge of St. Olaf.	70.7	1957-77 1986-89	08-16-89	0.00
Howard Creek	Lat 42°57'44", long 91°22'09", in NW1/4 NW1/4 sec. 18, T.94 N., R.4 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road X28 in Farmersburg, downstream of the mouth of an unnamed creek.	13.8	1988-69	08-17-89	0.14
Howard Creek	Lat 42°56'48", long 91°22'23", in NE1/4 NE1/4 sec. 24, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, at bridge on county road X28, 0.9 mi S of Farmersburg.	17.8	1988-89	04-04-89 08-17-89	0.46 0.07

Discharge measurements in the following table were made at special study and miscellaneous sites throughout the Cedar River Basin.

Stream	Location	Drainage area (mi^2)	Period of record	Measurements	
				Date	Discharge (ft^3/s)
	Cedar River Basin				
Cedar River at Cedar Rapids (05464500)	Lat 41°58'14", long 91°40'01", in SE1/4 NW1/4 sec.28. T.83 N., R.7 W., Linn County, Hydrologic Unit 07080205, on right bank 400 ft upstream from bridge on Eight Ave. in Cedar Rapids, 2.7 mi upstream from Prairie Creek, and at mile 112.7 upstream from mouth of Iowa River.	6,510	1902-88	09-20-89 09-20-89 09-21-89	601 617 576
Prairie Creek	Lat 41°56'59", long 91°38'22", in SE1/4 SE1/4 SE1/4 sec. 34, T.83 N., R.7 W., Linn County, Hydrologic Unit 07080205, at bridge, near S edge of Cedar Rapids.	216		09-20-89	39
Indian Creek	Lat 41°58'02", long 91°34'52", in SE1/4 NE1/4 SE1/4 sec. 30, T.83 N., R.6 W., Linn County, Hydrologic Unit 07080205, at bridge , 5 mi E of Cedar Rapids.	93.0	1989	09-20-89	3.4
Big Creek	Lat 41°56'30", long 91°32'41", in SE1/4 SW1/4 NE1/4 sec. 4, T.82 N., R.6 W., Linn County, Hydrologic Unit 07080206, at bridge, on Hwy 13, 1 mi W of Bertram.	111	1989	09-20-89	7.8
Pleasant Run Creek	Lat 41°55'53", long 91°33'42", in SE1/4 NE1/4 NE1/4 sec 8, T.82 N., R.6 W., Linn County, Hydrologic Unit 07080206, at bridge, 2 mi W of Bertram.	7.33	1989	09-20-89	0.32
Spring Creek	Lat 41°53'00", long 91°25'31", in SE1/4 SE1/4 SE1/4 sec. 28, T.82 N., R.5 W., Linn County, Hydrologic Unit 07080206, at bridge, 3.5 mi S of Mt. Vernon	11.0	1989	09-20-89	1.9
Clear Creek	Lat 41°53'12", long 91°19'33", in SW1/4 NW1/4 NW1/4 sec. 28, T.82 N., R.4 W., Cedar County, Hydrologic Unit 07080206, at bridge, 5.3 mi SW of Mechanicsville.	6.67	1989	09-20-89	0.85
Clear Creek	Lat 41°51'13", long 91°23'08", in SE1/4 SE1/4 SE1/4 sec. 2, T.81 N., R.5 W., Johnson County, Hydrologic Unit 07080206, at bridge, 1.1 mi N of Sutliff.	22.4	1989	09-20-89	3.1
Coon Creek	Lat 41°49'27", long 91°21'51", in SW1/4 SW1/4 NW1/4 sec. 18, T.81 N., R.4 W., Cedar County, Hydrologic Unit 07080206, at bridge, 2.3 mi SE of Sutliff.	7.60	1989	09-20-89	0.66
Baldwin Creek	Lat 41°48'42", long 91°18'26", in NW1/4, SW1/4 NW1/4 sec.22, T.81 N., R.4 W., Cedar County, Hydrologic Unit 07080206, at bridge, 2.2 mi N of Cedar Bluff.	10.9	1989	09-20-89	1.8
Mill Creek	Lat 41°48'31", long 91°23'50", in NE1/4 NE1/4 SW1/4 sec. 23, T.81 N., R.5 W., Johnson County, Hydrologic Unit 07080206, at bridge, 5.5 mi E of Solon.	7.65	1989	09-20-89	0.35
Cedar River at Cedar Bluff	Lat 41°47'10", long 91°18'39", in NW1/4 NE1/4 NE1/4 sec. 33, T.81 N., R.4 W., Cedar County, Hydrologic Unit 07080206, at bridge, near W edge of Cedar Bluff.	70	1989	09-20-89 09-21-89 09-21-89	756 740 730
Gower Creek	Lat 41°46'32", long 91°19'44", in NW1/4 SE1/4 SE1/4 sec. 32, T.81 N., R.4 W., Cedar County, Hydrologic Unit 07080206, at bridge, 1.7 mi SW of Cedar Bluff.	6.2	1989	09-21-89	0.01
Unnamed Creek	Lat 41°45'44", long 91°14'22", in SE1/4 NE1/4 SW1/4 sec. 6, T.80 N., R.3 W., Cedar County, Hydrologic Unit 07080206, at bridge, 0.5 mi SE of Cedar Bluff.	--	1989	09-21-89	0.17

Stream	Location	Drainage area (mi²)	Period of record	Measurements Date	Measurements Discharge (ft³/s)
	Cedar River Basin--Continued				
Nickoloson Creek	Lat 41°44'53", long 12°17'14", in SW1/4 SW1/4 NW1/4 sec. 11, T.80 N., R.4 W., Cedar County, Hydrologic Unit 07080206, at bridge, 3.4 mi NW of Cedar Valley.	18.3	1989	09-21-89	0.69
Rock Run	Lat 41°43'11", long 91°11'04", in NW1/4 NE1/4 SW1/4 sec. 22, T.80 N., R.3 W., Cedar County, Hydrologic Unit 07080206, at bridge, 5.3 mi SE of Cedar Valley.	23.3	1989	09-21-89	1.2
Unnamed Creek	Lat 41°42'35", long 91°13'55", in NE1/4 SE1/4 NE1/4 sec. 30, T.80 N., R.3 W., Cedar County, Hydrologic Unit 07080206, at bridge, 2.1 miles south of Cedar Valley.	--	1989	09-21-89	0.51
Rock Creek (05464800)	Lat 41°40'40", long 91°09'52", in NW1/4 sec. 2, T.79 N., R.3 W., Cedar County, Hydrologic Unit 07080206, at bridge, 0.5 mi NW of Rochester.	63.4	1988-89	09-21-89	6.5
Pee Dee Creek	Lat 41°39'12", long 91°09'04", in SW1/4 NW1/4 NW1/4 sec. 13, T.79 N., R.3 W., Cedar County, Hydrologic Unit 07080206, at bridge, 2.3 mi S of Rochester.	5.02	1989	09-21-89	0.20
Crooked Creek	Lat 41°39'00", long 91°07'06", in SE1/4 SW1/4 NE1/4 sec. 18, T.79 N., R.2 W., Cedar County, Hydrologic Unit 07080206, at bridge on Highway 38, 2.8 mi SE of Rochester.	18.4	1989	09-21-89	1.8
Sugar Creek	Lat 41°36'43", long 91°04'13", in NE1/4 NW1/4 NW1/4 sec. 34, T.79 N., R.2 W., Cedar County, Hydrologic Unit 07080206, at bridge, 4.1 mi N of Wilton.	98.4	1989	09-21-89	4.8
Sugar Creek	Lat 41°33'59", long 91°04'56", in NE1/4 NW1/4 NE1/4 sec. 16, T.78 N., R.2 W., Muscatine County, Hydrologic Unit 07080206, at bridge, 0.6 mi S of Moscow.	222	1989	09-21-89	22
Cedar River at Moscow	Lat 41°34'36", long 91°05'15", center of NE1/4 SE1/4 NW1/4 sec. 9, T.78 N., R.2 W., Muscatine County, Hydrologic Unit 07080206, 0.2 mi N of railroad bridge in Moscow.	7484	1989	09-20-89 09-21-89 09-21-89	798 740 756
Little Mosquito Creek	Lat 41°32'02", long 91°05'11", in SW1/4 NW1/4 NE1/4 sec. 28, T.78 N., R.2 W., Muscatine County, Hydrologic Unit 07080206, at bridge, 3.0 mi S of Moscow.	17.8	1989	09-21-89	0.96
Wapsinonoc Creek	Lat 41°28'53", long 91°16'33", in SW1/4 SE1/4 SE1/4 sec. 11, T.77 N., R.4 W Muscatine County, Hydrologic Unit 07080206, at bridge on Highway 6, 1.7 mi E of Nichols.	189.0	1989	07-24-88	14
Crane Creek	Lat 41°26'42", long 91°11'42", in SE1/4 SE1/4 NE1/4 sec. 28, T.77 N., R.3 W., Muscatine County, Hydrologic Unit 07080206, at bridge, 4.0 mi SE of Adams.	--	1989	09-22-89	0.49
Smith Run	Lat 41°24'58", long 91°15'36", in SW1/4 SW1/4 NE1/4 sec. 1, T.76 N., R.4 W., Muscatine County, Hydrologic Unit 07080206, at bridge, 3.2 mi N of Cranston.	9.67	1989	07-24-88	0.25
Cedar River at Conesville (05465000)	Lat 41°24'36", long 91°17'06", in SW1/4 SW1/4 sec.2, T.76 N., R.4 W., Muscatine County Hydrologic Unit 07080206, on right bank 10 ft down stream from bridge on county highway G28, 3.4 mi NE of Conesville, 5.2 mi downstream from Wapsinonoc Creek, 10.7 mi upstream from mouth, and at mile 39.8 upstream from mouth of Iowa River.	7,785	1939-89	09-20-89 09-21-89 09-22-89	925 934 954

05388250 UPPER IOWA R NR DORCHESTER IA (LAT 43 25 16N LONG 091 30 31W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 12...	1408	121	9.0	494	MAY 1989 12...	0930	232	15.0	485
NOV 29...	0910	131	1.0	539	JUN 29...	0930	137	22.5	360
JAN 1989 10...	1200	109	0.5	242	AUG 02...	1630	100	28.5	295
MAR 01...	1115	109	0.0	590	SEP 15...	0945	166	15.5	475
APR 10...	1357	205	7.0	555					

05411600 TURKEY RIVER AT SPILLVILLE, IOWA (LAT 43 12 28N LONG 091 56 56W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 14...	0920	12	8.0	507	MAY 1989 12...	1205	38	18.0	550
NOV 29...	1200	11	0.5	587	JUN 28...	2000	14	28.0	462
JAN 1989 10...	1500	12	0.5	615	AUG 02...	1900	8.0	29.5	435
APR 11...	0930	27	4.0	535	SEP 14...	1545	16	21.0	535

05412060 SILVER CREEK @ LUANA (LAT 43 01 19N LONG 091 29 21W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 12...	1055	0.14	7.0	757	MAR 1989 11...	1710	147	1.0	280
NOV 03...	0920	0.19	6.5	714	12...	1205	6.5	1.0	335
28...	1330	0.29	1.5	727	14...	1530	47	0.5	330
JAN 1989 09...	1430	0.14	4.0	758	APR 06...	1500	0.25	15.5	705
MAR 07...	1350	0.11	1.0	770	MAY 10...	1305	0.21	19.0	685
10...	1640	80	1.0	245	JUN 28...	1715	0.12	30.5	705
11...	1105	8.1	1.0	330	AUG 03...	0940	0.04	23.0	860

05412070 UNNAMED TRIBUTARY AT LUANA, IA (LAT 43 02 24N LONG 091 28 07W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
MAR 1989 10...	1200	--	0.0	219	MAR 1989 11...	1045	--	0.0	244
10...	1740	--	0.5	195	11...	1510	--	0.0	160
					12...	1315	--	0.0	220

05412100 ROBERTS C AB ST. OLAF, IOWA (LAT 42 55 49N LONG 091 23 03W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
NOV 1988 03...	1140	1.2	7.0	704	APR 1989 06...	1325	1.1	8.5	700
28...	1117	4.2	1.0	758	MAY 10...	1140	2.0	14.0	620
JAN 1989 09...	1050	0.50	0.0	867	SEP 12...	1515	0.13	14.0	560
FEB 28...	1616	0.89	0.0	730					
MAR 15...	0853	122	0.0	330					

05412500 TURKEY RIVER AT GARBER, IOWA (LAT 42 44 24N LONG 091 15 42W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 11...	1355	156	13.5	543	MAY 1989 10...	0935	346	12.0	555
NOV 23...	0955	196	2.0	594	JUN 27...	1430	201	27.0	545
FEB 1989 28...	1440	207	0.0	540	AUG 01...	1430	113	28.0	502
APR 06...	1050	340	7.0	465	SEP 13...	1945	275	17.0	600

05418450 NF MAQUOKETA R AT FULTON IA (LAT 42 08 42N LONG 090 40 55W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 07...	1215	116	10.0	635	MAY 1989 09...	1105	135	13.0	610
NOV 22...	1245	126	2.5	633	JUN 27...	0830	105	21.5	595
JAN 1989 05...	1145	126	1.0	648	AUG 01...	0815	90	21.5	530
FEB 28...	1015	133	0.0	250	SEP 12...	1500	145	18.0	625
APR 05...	1230	142	16.0	635					

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
05418500	MAQUOKETA RIVER NEAR MAQUOKETA, IOWA (LAT 42 05 05N LONG 090 38 04W)								
OCT 1988 07...	0930	207	8.5	588	JUN 1989 26...	2000	372	25.0	542
NOV 22...	1105	370	3.0	610	JUL 31...	1830	390	27.0	425
APR 1989 05...	1000	475	8.5	575	SEP 12...	1050	518	18.0	490
MAY 09...	0920	478	13.0	553					
05420500	MISSISSIPPI RIVER AT CLINTON, IOWA (LAT 41 46 53N LONG 090 15 04W)								
OCT 1988 04...	1230	27400	18.0	380	AUG 1989 23...	1115	20200	27.0	450
MAR 1989 27...	1500	49200	6.0	410					
05420560	WAPSIPINICON RIVER NEAR ELMA, IOWA (LAT 43 14 34N LONG 092 31 48W)								
OCT 1988 04...	0905	1.3	9.0	410	MAY 1989 01...	1355	38	11.0	540
NOV 08...	1010	6.2	5.0	430	JUN 14...	0915	5.4	17.0	430
JAN 1989 13...	1100	4.6	0.0	550	JUL 25...	1110	8.2	29.0	500
FEB 14...	1320	5.2	0.0	390	AUG 29...	1110	14	25.0	390
05421000	WAPSIPINICON R AT INDEPENDENCE, IOWA (LAT 42 27 49N LONG 091 53 42W)								
OCT 1988 14...	1310	22	13.5	408	MAY 1989 10...	1330	210	16.5	410
NOV 25...	1045	70	4.0	370	JUN 29...	1315	36	27.5	450
JAN 1989 11...	0910	39	1.0	543	AUG 03...	1415	28	28.0	430
MAR 01...	1630	36	1.5	550	SEP 15...	1330	201	17.5	500
APR 11...	1315	183	9.0	435					
05422000	WAPSIPINICON RIVER NEAR DE WITT, IOWA (LAT 41 46 01N LONG 090 32 05W)								
OCT 1988 06...	1255	147	11.5	412	MAY 1989 08...	1345	647	0.0	410
NOV 21...	1615	244	3.0	402	JUN 26...	1700	253	26.5	408
JAN 1989 04...	1500	170	0.5	596	JUL 31...	1545	140	29.0	440
FEB 27...	1500	240	0.0	550	SEP 18...	1700	657	21.5	450
APR 04...	1430	748	9.0	400					
05422470	CROW C AT BETTENDORF IA (LAT 41 33 03N LONG 090 27 15W)								
OCT 1988 06...	0950	0.17	8.0	582	MAY 1989 08...	1005	1.4	12.0	785
NOV 21...	1010	0.63	2.0	524	JUN 26...	1200	0.94	27.0	570
JAN 1989 04...	0915	0.74	0.5	862	JUL 31...	1220	0.79	26.0	620
FEB 27...	0950	0.63	0.0	725	SEP 18...	1300	3.6	19.5	800
APR 04...	1005	1.4	8.0	815					
05449500	IOWA RIVER NEAR ROWAN, IOWA (LAT 42 45 36N LONG 093 37 23W)								
OCT 1988 03...	0955	15	14.0	500	JUN 1989 13...	0940	17	19.0	670
NOV 07...	0855	19	3.0	500	JUL 24...	1025	14	26.0	625
JAN 1989 19...	1225	14	0.0	610	SEP 06...	1335	19	24.0	560
MAY 02...	1010	92	10.0	860					

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
05451700	TIMBER CREEK NEAR MARSHALLTOWN, IOWA (LAT 42 00 25N LONG 092 51 15W)								
APR 1989					JUL 1989				
18...	1055	1050	5.0	560	06...	1420	1.1	30.0	660
MAY					AUG				
23...	1040	2.2	19.0	690	16...	1125	2.4	21.0	580
05451900	RICHLAND CREEK NEAR HAVEN, IOWA (LAT 41 53 58N LONG 092 28 27W)								
OCT 1988					APR 1989				
04...	1120	0.49	11.0	465	25...	1000	1.5	19.0	505
NOV					JUN				
07...	1415	0.89	5.0	478	07...	1315	0.78	24.0	540
DEC					JUL				
19...	1225	0.51	2.0	510	18...	1300	5.4	23.0	335
JAN 1989					AUG				
30...	1200	23	1.0	277	28...	1250	7.3	20.0	325
MAR					SEP				
14...	1115	5.0	2.0	395	09...	1500	70	17.5	480
05452000	SALT CREEK NR ELBERON, IOWA (LAT 41 57 51N LONG 092 18 47W)								
OCT 1988					APR 1989				
04...	0930	5.1	9.0	491	25...	0830	10	20.0	550
NOV					JUN				
07...	0955	6.8	3.0	574	07...	0945	6.7	20.0	590
DEC					JUL				
19...	0930	3.9	0.0	555	18...	1430	6.0	23.0	505
FEB 1989					AUG				
06...	1330	13	0.0	580	28...	1015	7.8	21.0	430
MAR									
13...	1350	48	2.0	350					
05453000	BIG BEAR CREEK AT LADORA, IOWA (LAT 41 44 58N LONG 092 10 55W)								
OCT 1988					JUN 1989				
05...	0830	2.7	9.0	684	06...	1110	5.4	0.0	840
NOV					JUL				
09...	0915	3.9	5.0	835	18...	0940	13	22.5	550
DEC					AUG				
20...	0945	4.6	0.0	647	29...	1015	6.0	20.0	1470
JAN 1989					SEP				
31...	1120	50	2.0	375	09...	1115	974	19.0	390
APR									
25...	1300	5.5	22.0	1180					
05453100	IOWA RIVER AT MARENGO, IOWA (LAT 41 48 41N LONG 092 03 42W)								
OCT 1988					FEB 1989				
05...	1040	90	11.0	520	14...	1045	188	0.0	622
NOV					MAR				
08...	1000	94	3.0	590	13...	0950	2460	1.0	220
DEC					APR				
21...	0945	92	0.0	770	24...	1145	24	16.0	525
29...	0950	98	0.0	740	JUN				
JAN 1989					08...	1215	358	23.0	565
05...	0945	76	0.0	760	JUL				
12...	1000	135	0.0	488	19...	0945	250	23.0	430
19...	1000	128	0.0	632	AUG				
26...	1030	238	0.5	305	29...	1320	157	21.0	560
31...	0845	1080	1.0	320					
05454300	CLEAR CREEK NR CORALVILLE, IOWA (LAT 41 40 36N LONG 091 35 55W)								
OCT 1988					FEB 1989				
05...	1420	1.2	12.0	600	01...	1405	27	0.0	450
NOV					09...	1005	1.9	0.0	785
09...	1130	2.0	6.0	752	MAR				
DEC					14...	1640	12	2.0	560
13...	1155	3.2	0.0	580	APR				
20...	1505	3.9	0.0	815	25...	1520	12	24.0	775
29...	1245	3.1	0.0	1200	JUN				
JAN 1989					09...	1245	8.0	18.0	880
05...	1220	2.0	0.0	918	JUL				
12...	1330	4.3	0.0	531	19...	1330	32	22.0	380
20...	1445	5.5	0.0	415	AUG				
26...	1345	7.4	0.0	830	30...	1305	3.0	22.0	790

05454500 IOWA RIVER AT IOWA CITY, IOWA (LAT 41 39 24N LONG 091 32 27W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 06...	1130	150	11.0	540	APR 1989 26...	0930	203	17.0	490
NOV 10...	0835	160	6.0	525	JUN 14...	1100	616	22.0	600
DEC 21...	1232	115	3.0	540	JUL 20...	1023	158	23.0	460
FEB 1989 01...	1125	1620	1.0	411	AUG 31...	1425	215	21.0	500
MAR 16...	1500	1990	2.0	500					

05455100 OLD MANS CR NR IOWA CITY, IOWA (LAT 41 36 25N LONG 091 36 40W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 06...	0905	1.2	9.0	440	APR 1989 26...	1120	7.6	21.0	600
NOV 09...	1315	18	6.0	533	JUN 14...	1255	12	18.0	425
DEC 20...	1230	2.3	0.5	544	JUL 20...	1150	23	23.0	310
MAR 1989 14...	1420	18	2.0	365	AUG 30...	1445	3.4	22.0	600

05455500 ENGLISH RIVER AT KALONA, IOWA (LAT 41 27 59N LONG 091 42 56W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 13...	1250	3.5	10.0	475	MAR 1989 16...	1115	61	2.0	333
NOV 16...	1320	13	6.0	550	APR 26...	1530	15	26.0	548
DEC 21...	1320	10	0.0	550	JUN 13...	1000	66	20.0	440
FEB 1989 01...	1340	141	0.0	270	AUG 25...	0955	20	21.0	400

05455700 IOWA RIVER NEAR LONE TREE, IOWA (LAT 41 25 15N LONG 091 28 25W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 13...	1445	181	13.0	525	APR 1989 26...	1307	334	24.0	512
DEC 22...	1000	165	0.0	600	JUN 13...	1207	826	22.0	450
FEB 1989 02...	0930	1620	1.0	570	JUL 14...	1250	176	28.0	560
MAR 16...	1200	2690	1.5	420	AUG 25...	1200	195	22.0	530

05457700 CEDAR RIVER AT CHARLES CITY, IOWA (LAT 43 03 45N LONG 092 40 23W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 03...	1630	147	16.0	530	JUN 1989 13...	1730	155	21.0	580
NOV 08...	1335	143	6.0	590	JUL 28...	1030	134	26.0	340
FEB 1989 14...	1610	144	0.0	590	AUG 29...	1420	184	27.0	400
MAY 03...	1600	534	15.0	580					

05458000 LITTLE CEDAR RIVER NEAR IONIA, IOWA (LAT 43 02 05N LONG 092 30 05W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 04...	1100	12	9.0	450	MAR 1989 21...	0900	66	0.0	530
NOV 08...	1150	13	6.0	470	MAY 03...	1440	80	18.0	530
DEC 16...	1330	26	0.0	600	JUN 14...	1055	18	17.0	460
JAN 1989 13...	0905	10	0.0	690	JUL 25...	0850	19	25.0	450
FEB 14...	1450	23	1.0	490	AUG 29...	1245	5.5	26.0	425

05458500 CEDAR RIVER AT JANESVILLE, IOWA (LAT 42 38 54N LONG 092 27 54W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
04...	1715	202	14.0	470
NOV				
09...	1145	176	7.0	560
DEC				
14...	1120	205	0.0	710
19...	1255	179	2.0	700
JAN 1989				
03...	1200	192	0.0	530
12...	1335	139	0.0	680
16...	1030	164	0.0	680
20...	1045	235	1.0	630
24...	1110	210	0.0	560
26...	1205	230	0.0	600
FEB 1989				
07...	1140	314	0.0	570
09...	1110	248	0.0	540
13...	1315	268	0.0	540
16...	1045	219	0.0	580
24...	1150	166	0.0	610
MAR				
16...	1340	3180	1.0	220
MAY				
05...	1500	743	12.5	580
JUN				
14...	1415	212	20.0	450
JUL				
28...	1445	204	31.0	360
AUG				
30...	0825	109	23.0	460

05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IOWA (LAT 42 37 50N LONG 092 32 24W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
04...	1525	24	15.0	480
NOV				
09...	1015	27	7.0	520
JAN 1989				
20...	1425	39	0.0	500
FEB				
15...	1145	54	0.0	660
MAR				
21...	1500	350	1.0	490
MAY 1989				
05...	1245	160	13.0	650
JUN				
14...	1305	65	20.0	580
JUL				
24...	1205	31	30.5	530
AUG				
30...	1000	13	22.0	470

05459500 WINNEBAGO RIVER AT MASON CITY, IOWA (LAT 43 09 54N LONG 093 11 33W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
03...	1420	28	15.0	1030
NOV				
07...	1350	22	4.0	690
JAN 1989				
13...	1310	17	0.0	1100
FEB				
14...	1100	30	0.0	1300
MAR				
20...	1335	163	1.0	545
MAY 1989				
02...	1520	127	13.0	860
JUN				
13...	1455	23	20.5	1040
JUL				
24...	1530	41	27.5	525
AUG				
22...	1145	3.9	28.0	705

05462000 SHELL ROCK RIVER AT SHELL ROCK, IOWA (LAT 42 39 10N LONG 092 35 46W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
04...	1345	142	12.0	580
NOV				
08...	1525	120	5.0	710
JAN 1989				
12...	1640	113	0.0	630
FEB				
15...	0955	123	0.0	750
MAR				
13...	1430	1700	2.5	310
21...	1315	827	1.0	500
MAY 1989				
05...	1030	409	13.5	680
JUN				
14...	1120	142	19.5	620
JUL				
28...	1230	116	28.0	500
AUG				
22...	1440	60	28.0	520

05463000 BEAVER CREEK AT NEW HARTFORD, IOWA (LAT 42 30 50N LONG 092 37 55W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
05...	1055	6.2	9.0	600
NOV				
09...	0845	10	6.0	600
JAN 1989				
16...	1355	3.3	0.0	575
FEB				
15...	1310	12	0.0	620
MAY 1989				
05...	1145	53	14.0	560
JUN				
15...	1115	20	20.0	560
JUL				
24...	1430	8.3	30.5	480
AUG				
30...	1120	3.8	25.0	410

05463500 BLACK HAWK CREEK AT HUDSON, IOWA (LAT 42 24 28N LONG 092 27 47W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
05...	0900	6.5	7.5	680
NOV				
09...	1330	11	8.0	670
JAN 1989				
12...	1100	6.0	0.0	760
FEB				
13...	1100	13	0.0	670
APR 1989				
19...	1220	19	9.0	560
JUL				
25...	0925	4.9	26.0	600
AUG				
30...	1415	1.6	25.0	740

MISCELLANEOUS WATER-QUALITY DATA

05464000 CEDAR RIVER AT WATERLOO, IOWA (LAT 42 29 44N LONG 092 20 03W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
JAN 1989 27...	1145	580	1.5	550	AUG 1989 24...	1025	320	24.5	392

05464500 CEDAR RIVER AT CEDAR RAPIDS, IOWA (LAT 41 58 14N LONG 091 40 01W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 07...	1020	629	13.0	400	MAY 1989 31...	1200	1130	21.5	455
28...	1130	582	7.0	462	JUL 27...	1350	623	30.5	435
NOV 30...	1030	855	1.0	638	SEP 06...	1015	643	23.5	396
DEC 28...	1020	579	0.0	645	20...	1009	--	22.5	422
JAN 1989 24...	1135	727	1.0	575	20...	1824	--	21.5	395
MAR 29...	1100	5730	10.0	368	20...	1845	--	21.5	392
APR 27...	1230	1530	22.0	408	21...	1359	--	22.5	390
					21...	1400	--	22.5	392

05465000 CEDAR RIVER NEAR CONESVILLE, IOWA (LAT 41 24 36N LONG 091 17 06W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 14...	0945	715	11.0	600	APR 1989 26...	1010	2490	20.0	450
NOV 17...	1145	1070	5.0	625	JUN 13...	1415	1500	23.0	605
FEB 1989 02...	1215	2140	0.5	445	SEP 22...	1200	--	18.0	505
MAR 16...	0855	5720	2.0	285					

05470000 SOUTH SKUNK RIVER NEAR AMES, IOWA (LAT 42 04 05N LONG 093 37 02W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
NOV 1988 07...	1420	2.1	13.0	750	MAY 1989 23...	1455	6.7	24.0	890
JAN 1989 18...	1330	4.3	2.0	950	JUL 07...	1015	12	29.0	740
APR 19...	1010	1010	9.5	790					

05470500 SQUAW CREEK AT AMES, IOWA (LAT 42 01 21N LONG 093 37 45W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
JAN 1989 19...	1115	1.2	5.0	940	JUN 1989 27...	1045	255	23.0	495
APR 19...	0840	5.6	9.5	710	JUL 07...	1245	11	31.0	750

05471200 INDIAN CREEK NEAR MINGO, IOWA (LAT 41 48 17N LONG 093 18 26W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 04...	1025	0.91	10.0	550	APR 1989 27...	1220	6.2	24.0	1000
NOV 14...	1155	5.9	6.5	1200	JUN 08...	1450	12	22.5	800
DEC 21...	0850	1.7	0.0	500	JUL 13...	1125	1.2	26.5	590
MAR 1989 10...	1340	433	1.0	260	AUG 31...	1140	3.2	26.0	640
16...	1115	27	3.0	550					

05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IOWA (LAT 41 21 19N LONG 092 39 31W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 04...	1230	24	13.0	580	APR 1989 24...	1200	79	19.0	710
NOV 08...	1150	35	5.0	590	JUN 05...	1320	296	26.0	440
DEC 19...	1000	14	0.0	920	JUL 17...	1010	101	24.0	430
FEB 1989 07...	1005	58	0.0	600	AUG 28...	1155	129	24.5	410
MAR 23...	1520	156	9.0	580					

05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IOWA (LAT 41 18 03N LONG 092 12 16W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 13...	1005	8.0	7.5	575	APR 1989 24...	0940	28	16.5	570
NOV 14...	1025	17	5.0	600	JUN 05...	1020	103	21.0	340
DEC 21...	1020	9.0	0.0	675	JUL 17...	0910	23	21.0	310
JAN 1989 30...	0930	80	0.0	390	AUG 28...	0915	351	24.0	240
MAR 21...	1035	56	4.0	440					

05473400 CEDAR CR NR OAKLAND MILLS, IOWA (LAT 40 55 00N LONG 091 40 00W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 12...	1330	1.3	17.5	430	APR 1989 26...	1445	7.5	24.0	925
NOV 16...	1015	18	9.0	860	JUN 02...	0830	80	20.0	279
DEC 20...	1245	5.0	1.5	850	JUL 06...	1355	17	30.0	462
FEB 1989 01...	1130	16	2.0	615	AUG 24...	1245	491	23.0	330
MAR 22...	1015	14	2.5	600					

05476500 DES MOINES RIVER AT ESTHERVILLE, IOWA (LAT 43 23 51N LONG 094 50 38W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 05...	1020	8.3	9.0	1150	APR 1989 24...	1045	79	13.0	840
NOV 08...	1200	13	4.0	2000	JUN 07...	0915	58	22.0	950
JAN 1989 25...	1335	5.9	1.0	1650	JUL 19...	1500	110	24.0	960
MAR 01...	0950	4.5	0.0	1630	AUG 31...	1645	14	28.0	1250
28...	1215	812	3.5	440					

05476750 DES MOINES RIVER AT HUMBOLDT, IOWA (LAT 42 43 12N LONG 094 13 06W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 05...	1730	71	13.0	620	APR 1989 27...	1200	299	17.0	680
DEC 02...	1045	80	1.0	650	JUN 05...	1230	151	23.0	520
30...	1045	56	2.0	860	JUL 17...	1230	81	25.0	850
FEB 1989 27...	1305	46	1.0	800	AUG 23...	1215	34	27.0	890
MAR 23...	1240	31	4.0	780					

05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IOWA (LAT 42 43 26N LONG 094 11 30

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 05...	1515	28	12.5	740	APR 1989 27...	1000	236	19.0	640
JAN 1989 19...	1410	23	1.0	980	JUN 05...	0955	103	22.5	780
FEB 27...	1120	24	0.0	920	JUL 17...	1030	42	27.0	910
MAR 23...	1030	16	1.0	760	AUG 23...	1030	18	27.5	790

05480500 DES MOINES RIVER AT FORT DODGE, IOWA (LAT 42 30 22N LONG 094 12 04W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
NOV 1988 14...	1225	135	7.0	750	APR 1989 28...	1200	730	18.0	640
DEC 13...	1000	112	1.0	900	JUN 05...	1550	371	23.5	560
19...	0930	101	0.0	1000	AUG 23...	1430	72	28.0	710
30...	1410	143	2.0	910					
FEB 1989 27...	0815	91	0.0	650					

05481000 BOONE RIVER NEAR WEBSTER CITY, IOWA (LAT 42 26 01N LONG 093 48 12W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 31...	1020	15	9.0	850	JUL 1989 03...	1105	89	3.0	570
APR 1989 21...	1035	48	18.0	750	AUG 14...	1320	28	25.0	580

05481300 DES MOINES RIVER NR STRATFORD, IOWA (LAT 42 15 04N LONG 093 59 52W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 31...	1245	108	10.0	760	JUL 1989 03...	1310	405	30.0	550
APR 1989 27...	1035	917	20.0	680	AUG 18...	0950	187	24.0	620
MAY 30...	1145	1250	25.0	670					

05481950 BEAVER CREEK NEAR GRIMES, IOWA (LAT 41 41 18N LONG 093 44 08W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
NOV 1988 03...	0845	0.10	7.0	860	MAY 1989 23...	0625	20	21.0	570
APR 1989 12...	1400	4.6	5.0	630	JUL 07...	1335	12	32.0	660

05482135 NORTH RACCOON RIVER NR NEWELL, IOWA (LAT 42 36 16N LONG 095 02 42W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 04...	1100	54	9.0	780	APR 1989 04...	1645	42	9.0	700
NOV 09...	1100	16	8.0	760	26...	1630	30	23.0	660
JAN 1989 23...	1125	23	0.0	475	JUN 06...	1240	36	24.0	760
FEB 23...	1110	9.0	0.0	500	JUL 20...	1130	6.4	24.0	680
MAR 22...	1415	42	1.0	740	AUG 08...	1230	2.5	26.0	775
					22...	1100	1.3	30.0	800

05482170 BIG CEDAR CREEK NEAR VARINA, IOWA (LAT 42 41 16N LONG 094 47 52W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 04...	1320	18	11.5	790	MAY 1989 04...	0920	15	11.0	630
NOV 08...	0930	5.0	4.0	880	JUN 06...	1030	11	22.0	640
JAN 1989 23...	1400	6.3	0.0	800	JUL 19...	1130	2.3	24.0	940
MAR 01...	1720	1.8	0.0	1100	AUG 30...	1000	0.70	28.0	1310
22...	1240	18	0.0	890					
APR 26...	0940	9.2	17.0	640					

05482300 N RACCOON R NR SAC CITY IOWA (LAT 42 20 28N LONG 094 59 05W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 03...	1730	170	12.5	740	APR 1989 26...	1830	89	18.0	640
NOV 09...	1240	48	5.0	600	JUN 08...	1500	111	23.0	660
JAN 1989 23...	1250	79	0.0	790	JUL 20...	1415	31	28.0	760
FEB 23...	1350	38	0.0	800	AUG 22...	1500	8.4	27.5	700
MAR 22...	1050	163	8.0	450					

05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IOWA (LAT 41 59 17N LONG 094 22 36W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 03...	1330	468	13.5	740	APR 1989 25...	1200	170	16.0	640
JAN 1989 26...	1010	162	0.0	710	25...	1630	1670	21.0	620
FEB 13...	1315	105	0.0	700	JUN 09...	1330	875	20.0	660
MAR 24...	1650	314	7.5	720	JUL 18...	1245	100	26.0	640
					28...	1440	55	28.0	660
					AUG 22...	1745	34	31.5	650

05483000 EAST FORK HARDIN CREEK NR. CHURDAN, IOWA (LAT 42 06 27N LONG 094 22 12W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 03...	1210	0.17	10.5	670	JUN 1989 09...	1630	5.3	21.5	660
MAR 1989 29...	1430	0.41	9.0	480	JUL 18...	1025	2.0	22.0	390

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
05483450 M RACCOON R NR BAYARD, IOWA (LAT 41 47 00N LONG 094 30 00W)									
NOV 1988 01...	1055	40	7.0	690	MAY 1989 22...	1105	42	20.0	740
DEC 02...	1010	154	2.0	540	JUL 05...	1050	115	27.0	740
JAN 1989 18...	1345	34	1.0	770	AUG 18...	1240	31	23.0	610
APR 17...	1225	42	5.0	850					
05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA (LAT 41 41 14N LONG 094 22 15W)									
NOV 1988 01...	1315	42	9.0	490	JUL 1989 05...	1220	90	29.0	480
JAN 1989 18...	1240	49	4.0	610	SEP 08...	1240	3010	24.0	480
APR 17...	1435	41	5.0	600					
05484000 SOUTH RACCOON RIVER AT REDFIELD, IOWA (LAT 41 34 48N LONG 094 10 58W)									
NOV 1988 01...	1505	94	9.0	460	MAY 1989 22...	1415	93	25.0	480
JAN 1989 18...	1120	107	0.0	550	JUL 05...	1435	135	30.0	490
APR 20...	1435	85	19.0	450	AUG 18...	0920	77	22.0	470
05484800 WALNUT CREEK AT DES MOINES, IOWA (LAT 41 35 14N LONG 093 42 11W)									
OCT 1988 05...	1125	1.9	8.0	760	JUN 1989 07...	1550	11	28.0	720
FEB 1989 09...	0810	1.2	0.0	605	JUL 12...	1135	9.5	27.0	340
MAR 17...	1155	7.7	0.5	620	AUG 30...	1045	7.6	22.0	430
APR 25...	1605	2.0	28.0	820					
05485500 DES MOINES R. BL RACCOON R. AT DES MOINES, IOWA (LAT 41 34 30N LONG 093 35 48									
OCT 1988 06...	1040	830	11.0	620	APR 1989 26...	0845	520	21.0	480
DEC 21...	1600	506	0.5	100	JUN 07...	1200	3050	24.0	520
FEB 1989 09...	0940	564	0.0	625	JUL 19...	0920	1660	24.0	450
MAR 23...	0940	1940	4.0	690	AUG 30...	0825	603	24.0	440
05485640 FOURMILE CREEK AT DES MOINES, IOWA (LAT 41 36 50N LONG 093 32 43W)									
NOV 1988 15...	0810	1.5	10.0	1240	JUN 1989 07...	1415	12	27.0	830
FEB 1989 09...	1350	1.7	0.0	1750	JUL 19...	1135	42	21.5	780
MAR 17...	0920	4.4	0.0	1170	AUG 23...	1225	9.6	25.0	820
APR 26...	1115	2.9	23.0	1480					
05486000 NORTH RIVER NEAR NORWALK,IOWA (LAT 41 27 25N LONG 093 39 10W)									
DEC 1988 20...	1440	2.5	0.5	650	JUN 1989 07...	0920	20	23.0	420
MAR 1989 22...	1520	16	5.0	460	JUL 18...	1625	9.5	25.0	340
APR 25...	1350	6.3	23.0	560	AUG 29...	1430	48	25.5	310
05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA (LAT 41 25 27N LONG 093 35 09W)									
OCT 1988 06...	1030	12	9.0	490	APR 1989 25...	1145	16	25.5	580
NOV 10...	0900	5.6	4.5	550	JUN 06...	1620	19	30.0	490
DEC 20...	1235	11	0.0	620	JUL 18...	1430	54	28.0	310
MAR 1989 22...	1330	48	6.0	660	AUG 29...	1220	14	27.0	440

05487470 SOUTH RIVER NEAR ACKWORTH, IOWA (LAT 41 20 14N LONG 093 29 10W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 06...	1415	2.4	14.0	550	APR 1989 18...	1100	3.8	11.5	570
NOV 09...	1700	3.8	7.5	525	JUN 06...	1440	9.1	28.5	470
DEC 20...	1030	7.3	0.5	610	JUL 18...	1025	48	23.5	230
FEB 1989 08...	1020	3.3	0.0	120	AUG 29...	1125	4.6	26.0	490
MAR 22...	1045	6.2	4.0	720					

05487500 DES MOINES RIVER NR RUNNELLS, IOWA (LAT 41 29 19N LONG 093 20 17W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
NOV 1988 14...	1555	534	8.5	640	JUL 1989 19...	1440	1750	24.0	450
APR 1989 26...	1345	584	25.0	540	AUG 30...	1500	1070	26.5	400
JUN 08...	1010	2260	22.0	560					

05487980 WHITE BREAST CREEK NEAR DALLAS, IOWA (LAT 41 14 41N LONG 093 16 08W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 05...	1400	1.5	12.0	380	APR 1989 25...	0935	1.7	22.0	680
NOV 10...	1200	1.6	7.0	590	JUN 06...	1250	6.6	27.0	470
DEC 20...	0915	3.2	0.5	620	JUL 18...	0835	0.97	20.0	470
FEB 1989 08...	0820	2.4	0.0	320	AUG 29...	0820	5.4	24.0	390
MAR 21...	1510	6.8	4.5	500					

05488200 ENGLISH CR NR KNOXVILLE, IOWA (LAT 41 16 00N LONG 093 05 00W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 05...	0915	0.40	9.0	395	APR 1989 25...	0725	0.32	20.0	880
DEC 19...	1610	0.23	0.5	1300	JUN 06...	1100	2.8	22.0	425
FEB 1989 07...	1510	0.58	0.0	820	JUL 17...	1700	0.01	27.0	1400
MAR 22...	0835	1.3	1.0	620	AUG 28...	1600	3.9	27.0	810

05488500 DES MOINES RIVER NEAR TRACY, IOWA (LAT 41 16 53N LONG 092 51 34W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 04...	1715	371	15.0	530	APR 1989 24...	1345	752	22.0	550
NOV 09...	1400	336	8.0	615	JUN 06...	0850	3130	22.0	530
DEC 19...	1220	644	0.5	570	JUL 17...	1325	1590	26.5	500
FEB 1989 07...	1225	438	0.0	685	AUG 28...	1520	1380	25.0	500
MAR 21...	1145	1370	2.5	620					

05489000 CEDAR CREEK NEAR BUSSEY, IOWA (LAT 41 13 09N LONG 092 54 38W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988 05...	1230	1.5	14.0	410	APR 1989 24...	1600	3.4	21.0	1010
NOV 08...	1530	0.66	8.0	825	JUN 05...	1550	7.3	27.5	560
FEB 1989 07...	1315	3.3	0.0	755	JUL 17...	1500	4.0	27.0	425
MAR 21...	1320	12	0.5	650	AUG 28...	1425	20	24.5	920

05489500 DES MOINES RIVER AT OTTUMWA, IOWA (LAT 41 00 39N LONG 092 24 40W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
NOV 1988 14...	1230	908	7.0	700	JUN 1989 01...	1130	3700	22.0	552
JAN 1989 30...	1200	977	5.0	715	JUL 06...	0950	1350	30.0	580
MAR 20...	1120	2150	1.5	390	AUG 23...	1230	1200	25.5	548
APR 25...	0915	143	18.5	650					

05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA (LAT 40 43 40N LONG 091 57 34W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988					APR 1989				
12...	1100	836	9.5	625	25...	1315	784	23.0	530
NOV					JUN				
15...	1445	382	13.0	675	01...	1630	3180	24.0	580
FEB 1989					JUL				
01...	0900	2040	3.0	740	06...	1815	1350	34.0	448
MAR					AUG				
21...	1345	1600	1.5	420	24...	1000	326	22.0	490

06483500 ROCK RIVER NEAR ROCK VALLEY, IOWA (LAT 43 12 52N LONG 096 17 39W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988					MAY 1989				
05...	1320	45	11.0	730	02...	1420	260	13.5	830
NOV					JUN				
17...	0940	23	0.5	910	13...	1400	52	18.0	690
DEC					AUG				
21...	1125	28	0.0	950	02...	1245	43	26.0	580
FEB 1989					SEP				
08...	1400	7.9	0.0	750	12...	1400	49	13.0	650
MAR									
21...	1530	271	0.0	570					
27...	1530	821	12.5	375					

06600000 PERRY CREEK AT 38TH STREET, SIOUX CITY, IOWA (LAT 42 32 05N LONG 096 24 35W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988					MAY 1989				
06...	1625	4.4	10.0	800	03...	1555	5.6	12.0	690
NOV					JUN				
15...	1600	4.4	6.5	740	12...	1435	4.0	21.5	720
DEC					AUG				
21...	1700	6.1	0.0	780	01...	1350	6.2	25.5	590
FEB 1989					SEP				
10...	0925	3.8	0.0	650	11...	1515	5.2	15.0	660
MAR									
22...	1550	10	4.0	790					

06600100 FLOYD RIVER AT ALTON, IOWA (LAT 42 58 55N LONG 096 00 03W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988					MAR 1989				
06...	1215	22	11.0	1010	22...	1230	12	1.5	830
NOV					27...	1715	43	13.5	640
16...	1045	8.8	2.0	950	MAY				
DEC					03...	1100	26	12.5	870
21...	1450	14	0.5	1110	JUN				
FEB 1989					14...	1035	8.9	16.5	850
09...	0945	5.5	0.0	900	AUG				
					02...	1030	7.3	26.0	750
					18...	1310	2.1	25.0	890

06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IOWA (LAT 42 55 15N LONG 096 10 30W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988					MAY 1989				
06...	0955	44	9.0	1240	02...	1105	19	10.5	1160
NOV					JUN				
17...	1235	25	1.0	1060	13...	0945	7.9	15.5	1160
DEC					AUG				
21...	0850	19	0.0	1170	02...	0845	7.5	22.0	1220
FEB 1989					SEP				
08...	1040	7.0	0.0	975	12...	1125	4.6	13.0	1200
MAR									
21...	1200	25	0.5	1120					
27...	1215	25	16.0	1030					

06600500 FLOYD RIVER AT JAMES, IOWA (LAT 42 34 36N LONG 096 18 43W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988					FEB 1989				
04...	1110	134	8.5	1040	07...	1500	34	0.0	1100
NOV					15...	1130	40	0.0	1060
15...	1305	86	7.5	990	24...	1150	49	0.0	1110
29...	1030	66	0.5	1000	27...	1300	77	0.0	880
DEC					MAR				
05...	1530	88	3.0	1000	09...	1015	60	0.0	955
12...	1200	74	0.0	1000	14...	1130	308	3.0	500
20...	1655	74	0.0	1000	20...	1515	147	4.0	890
28...	1545	64	0.0	1100	MAY				
JAN 1989					04...	0910	89	13.5	950
03...	1715	55	0.0	1160	JUN				
09...	1440	62	0.0	1170	12...	1145	49	23.0	890
18...	1545	61	0.0	1020	AUG				
23...	1400	79	0.0	955	01...	1600	73	32.0	700
					17...	1805	43	29.0	720
					22...	1200	35	26.0	930

06601200 MISSOURI RIVER AT DECATUR, NEBRASKA (LAT 42 00 26N LONG 096 14 29W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
04...	1415	30600	15.0	710
12...	1330	32600	14.0	740
17...	1650	33500	14.0	730
24...	1540	33700	12.5	760
31...	1515	35600	8.0	760
NOV				
07...	1315	34500	7.5	760
14...	1345	22200	5.0	800
22...	1215	14100	2.0	845
28...	1315	14400	2.0	780
DEC				
06...	1115	14100	4.0	780
19...	1230	14100	0.0	750
JAN 1989				
10...	1215	8490	0.0	830
17...	1300	14800	1.5	810
23...	1230	14100	1.0	805
30...	1330	14300	0.0	805
FEB				
27...	1715	14600	0.5	755
MAR				
08...	1030	15800	0.5	755
20...	1215	12200	1.0	790
29...	1400	26800	8.0	740
APR				
10...	1740	30300	6.0	740
17...	1405	31500	11.0	730
24...	1600	33000	16.5	750
MAY 1989				
01...	1230	31600	14.0	780
08...	1230	31500	14.0	750
16...	0805	33500	17.5	750
23...	0740	32700	20.0	750
31...	1500	31100	19.0	740
JUN				
06...	1515	31700	21.0	745
14...	1330	29900	19.0	740
19...	1645	32200	20.0	815
26...	1700	32400	22.0	770
JUL				
05...	1145	30200	24.0	760
10...	1430	30600	26.0	690
17...	1430	33300	25.0	760
26...	1200	32900	26.0	780
31...	1320	32400	28.5	780
AUG				
08...	1300	32000	22.0	830
15...	1500	32400	27.0	770
23...	1225	32400	25.5	790
30...	1040	30300	25.0	750
SEP				
06...	1730	29100	23.0	810
11...	1310	25000	20.0	820
19...	1720	27700	20.0	810
25...	1650	29500	18.0	800

06602020 WEST FORK DITCH AT HORNICK, IOWA (LAT 42 13 37N LONG 096 04 40W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
12...	1500	50	14.0	750
NOV				
30...	1200	42	2.0	740
JAN 1989				
13...	1120	36	0.0	740
FEB				
02...	1730	110	0.0	770
10...	1215	42	0.0	650
14...	1630	45	0.0	700
APR 1989				
05...	1445	58	12.0	700
MAY				
17...	1015	35	18.0	700
JUN				
29...	0930	38	23.0	700
AUG				
08...	1750	26	26.0	460
SEP				
19...	1345	25	23.0	650

06602400 MONONA-HARRISON DITCH NEAR TURIN, IOWA (LAT 41 57 52N LONG 095 59 30W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
14...	1100	81	12.5	760
NOV				
29...	1500	68	2.0	740
JAN 1989				
12...	1015	88	0.0	600
FEB				
15...	1630	81	0.0	700
MAR				
10...	1500	4660	1.5	220
APR 1989				
04...	1830	93	12.0	725
MAY				
16...	1715	57	21.0	700
JUN				
28...	1300	80	26.0	650
AUG				
07...	1850	43	22.0	525
SEP				
18...	1350	58	25.0	655

06605000 OCHEYEDAN R NR SPENCER, IOWA (LAT 43 07 44N LONG 095 12 37W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
04...	1820	19	10.0	680
NOV				
08...	1540	15	7.0	840
JAN 1989				
25...	1155	12	0.0	650
MAR				
01...	1220	8.3	0.0	800
28...	1645	89	10.0	460
APR 1989				
24...	1400	112	15.0	400
JUN				
06...	1800	37	23.5	660
JUL				
19...	1740	40	24.0	740
AUG				
30...	1830	13	28.0	810

06605850 L SIOUX R AT LINN GROVE, IOWA (LAT 42 53 24N LONG 095 14 30W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
04...	1600	59	11.5	530
NOV				
09...	0855	54	5.0	650
JAN 1989				
25...	1015	50	1.0	620
MAR				
01...	1420	32	0.0	750
29...	0920	292	7.0	460
APR 1989				
26...	1300	319	17.0	665
JUN				
06...	1450	105	23.5	710
JUL				
20...	0830	198	23.0	610
AUG				
30...	1515	35	27.0	670

06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA (LAT 42 28 20N LONG 095 47 49W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 07...	1030	175	9.0	660	MAY 1989 04...	1300	492	15.0	770
NOV 18...	1015	149	2.0	790	JUN 15...	1010	170	15.5	660
DEC 20...	0920	157	0.0	900	AUG 03...	1325	112	27.5	660
FEB 1989 09...	1445	115	0.0	750	17...	1700	50	25.0	720
MAR 23...	1145	509	3.0	540					

06607200 MAPLE RIVER AT MAPLETON, IOWA (LAT 42 09 28N LONG 095 48 27W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 13...	1130	104	11.0	760	MAY 1989 17...	1330	80	21.0	660
NOV 30...	1515	142	0.0	700	JUN 28...	1600	95	29.0	650
JAN 1989 12...	1715	140	0.0	670	AUG 08...	1515	47	26.0	495
FEB 15...	1430	111	0.0	750	09...	0950	43	19.0	575
APR 05...	1745	133	12.0	660	17...	1305	40	27.0	455
					SEP 18...	1815	74	23.0	745

06607500 LITTLE SIOUX RIVER NR. TURIN, IOWA (LAT 41 57 52N LONG 095 58 21W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 13...	1700	290	14.0	635	MAY 1989 18...	1200	349	12.0	640
NOV 29...	1100	336	0.0	750	JUN 28...	1020	317	22.0	600
FEB 1989 16...	1140	256	0.0	755	AUG 07...	1645	177	23.0	560
APR 05...	1130	558	8.0	650	SEP 18...	1615	204	24.0	650

06608500 SOLDIER RIVER AT PISGAH, IOWA (LAT 41 49 52N LONG 095 55 50W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 14...	1600	54	17.0	740	APR 1989 04...	1515	76	12.0	700
DEC 01...	1100	64	0.0	700	JUN 27...	1530	49	28.0	625
JAN 1989 11...	1600	62	0.0	600	AUG 07...	1350	28	22.0	660
FEB 16...	1530	60	0.0	610	SEP 20...	0835	34	18.0	700
MAR 10...	1145	741	1.5	220					

06609400 BOYER R NR DENISON, IOWA (LAT 42 00 00N LONG 095 23 00W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
MAY 1989 18...	1430	44	18.0	800	AUG 1989 09...	1115	19	24.0	680
JUN 29...	1145	78	27.0	650	SEP 21...	1330	32	25.0	640

06609500 BOYER RIVER AT LOGAN, IOWA (LAT 41 38 33N LONG 095 46 57W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 17...	1245	102	14.0	810	MAY 1989 16...	1100	65	18.0	800
DEC 01...	1430	109	1.0	800	JUN 27...	1140	228	24.0	500
JAN 1989 11...	1230	127	0.0	440	AUG 09...	1645	38	28.0	525
FEB 16...	1530	111	0.0	800	SEP 26...	1055	65	12.0	690
APR 04...	1145	121	9.0	825					

06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IOWA (LAT 41 23 24N LONG 095 22 17W)

DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	DATE	TIME	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)
OCT 1988 11...	1450	58	13.0	660	MAY 1989 15...	1530	40	24.5	600
NOV 28...	1445	37	0.0	610	JUN 26...	2000	4540	22.0	150
JAN 1989 18...	1500	48	0.0	700	AUG 10...	1400	52	25.0	600
FEB 15...	1500	50	0.0	610	SEP 20...	1515	266	20.0	680
APR 07...	1315	64	6.0	600					

06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IOWA (LAT 40 52 23N LONG 095 34 48W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
27...	1410	99	8.0	625
DEC				
13...	1125	96	0.0	750
JAN 1989				
24...	1145	114	0.0	550
MAR				
08...	1055	152	0.0	580
APR				
18...	1230	119	11.0	540
JUN 1989				
06...	0955	221	23.0	310
27...	1045	3620	21.0	225
JUL				
06...	1800	197	31.0	550
AUG				
15...	1300	84	22.0	550

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IOWA (LAT 41 20 47N LONG 095 04 31W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
11...	1050	24	8.5	570
NOV				
28...	1115	18	0.0	625
JAN 1989				
18...	1115	23	0.0	700
FEB				
15...	1230	21	0.0	600
MAR				
10...	1015	30	6.0	580
APR				
07...	1015	30	6.0	580
MAY 1989				
15...	1200	19	20.0	580
JUN				
26...	1530	1400	23.0	180
JUL				
10...	1245	27	23.0	580
AUG				
10...	1245	27	23.0	580
SEP				
20...	1240	182	19.0	575

06809500 EAST NISHNABOTNA RIVER NEAR RED OAK, IOWA (LAT 41 00 41N LONG 095 14 07W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
25...	1100	51	7.0	515
DEC				
09...	1325	34	0.0	605
16...	1150	42	0.0	675
21...	1200	64	0.0	680
30...	1200	64	0.0	680
JAN 1989				
04...	1140	50	0.0	570
10...	1000	68	0.0	590
19...	1100	73	0.0	550
24...	1350	71	1.0	470
FEB 1989				
01...	1140	225	0.0	490
09...	1805	51	0.0	480
16...	1515	56	0.0	500
MAR				
02...	1030	89	0.0	525
APR				
18...	1845	62	12.0	475
JUN				
05...	1615	146	26.0	325
JUL				
03...	1530	173	28.0	500
AUG				
15...	1650	76	23.0	500

06811840 TARKIO RIVER AT STANTON, IOWA (LAT 40 58 52N LONG 095 06 32W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
04...	0930	0.0	7.0	490
25...	1315	0.13	7.0	1150
DEC				
09...	1050	0.56	0.0	775
16...	0940	0.36	0.0	830
21...	1430	0.43	1.0	815
JAN 1989				
04...	1500	0.65	1.0	1000
24...	1610	0.59	0.0	500
FEB				
01...	1400	3.9	0.0	600
16...	1100	0.56	0.0	620
MAR 1989				
01...	1710	1.1	0.0	530
APR				
18...	1615	0.48	14.0	625
MAY				
10...	1450	0.60	22.0	500
JUN				
05...	1310	0.50	24.0	615
JUL				
03...	1210	10	25.0	415
AUG				
18...	1200	0.06	20.0	830

06813500 MISSOURI RIVER AT RULO, NEBRASKA (LAT 40 03 14N LONG 095 25 12W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
05...	1415	37800	16.0	700
11...	1400	38900	14.0	725
20...	1445	40000	14.0	750
27...	1130	38800	11.0	750
NOV				
02...	1315	38400	9.0	790
10...	1230	40700	8.0	745
15...	1300	31000	9.0	775
23...	1245	21300	6.0	725
DEC				
02...	0950	20600	5.0	950
06...	1315	21200	3.0	810
13...	1340	18500	2.0	750
19...	1130	19200	0.0	790
JAN 1989				
04...	1330	18400	1.0	800
17...	1330	19500	1.0	800
23...	1350	22900	3.5	740
31...	1315	24200	2.0	770
FEB				
15...	1410	25900	1.0	775
MAR				
15...	1230	38700	3.5	470
27...	1250	21900	11.0	800
APR				
12...	1430	36800	8.0	760
19...	1210	37700	12.0	740
26...	1300	35400	19.0	750
MAY 1989				
01...	1315	37200	17.0	745
11...	1145	36200	15.0	750
17...	1215	35200	19.0	770
24...	1330	36100	22.0	660
JUN				
01...	1745	34500	21.0	695
09...	1155	38400	22.5	750
12...	1400	38700	22.0	740
21...	1300	34500	22.0	740
29...	1345	41300	22.0	770
JUL				
06...	2130	39500	25.0	650
12...	1200	33200	29.5	800
19...	1500	44400	24.0	720
25...	1200	37900	24.0	760
AUG				
02...	1215	37000	26.0	780
08...	1330	34800	26.0	770
16...	1330	35000	27.0	790
23...	1730	35800	26.0	740
30...	1000	38900	24.0	710
SEP				
05...	1005	56500	23.0	575
11...	1130	73900	10.0	410
19...	0940	38900	20.0	740
27...	1410	35000	18.0	775

06818750 PLATTE RIVER NEAR DIAGONAL, IOWA (LAT 40 46 02N LONG 094 24 46W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
26...	1900	1.6	7.0	535
DEC				
14...	1220	2.2	0.0	650
JAN 1989				
25...	0940	3.5	0.0	560
MAR				
02...	1615	4.6	0.0	770
APR 1989				
19...	1420	3.0	18.0	540
JUN				
01...	1725	6.5	21.0	400
JUL				
05...	1700	2.1	30.0	425
AUG				
17...	1450	0.40	25.0	540

06819185 EAST FORK 102 RIVER AT BEDFORD, IOWA (LAT 40 39 40N LONG 094 42 58W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
25...	1730	0.25	9.0	580
DEC				
14...	1000	0.39	0.0	640
JAN 1989				
26...	1210	0.26	1.0	700
MAR				
02...	1320	0.47	0.0	760
APR				
19...	1145	0.26	14.0	540
JUN 1989				
02...	1340	0.42	27.0	460
JUL				
05...	1430	0.02	31.0	320
AUG				
17...	1700	0.0	25.0	520
SEP				
08...	1800	1180	20.0	145

06898000 THOMPSON RIVER AT DAVIS CITY, IOWA (LAT 40 38 25N LONG 093 48 29W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
26...	0930	0.86	4.0	540
DEC				
15...	0920	5.3	0.0	520
JAN 1989				
25...	1305	8.1	0.0	670
MAR				
08...	1740	39	0.0	475
APR				
20...	1300	7.0	14.0	550
JUN 1989				
01...	1335	50	22.0	510
JUL				
06...	1100	7.8	27.5	300
AUG				
16...	1155	0.74	22.0	450
SEP				
09...	1600	6350	19.0	185

06898400 WELDON RIVER NEAR LEON, IOWA (LAT 40 41 45N LONG 093 38 07W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
04...	1420	0.10	6.0	590
26...	1235	0.20	6.0	600
DEC				
15...	1140	0.19	0.0	550
JAN 1989				
25...	1400	1.1	0.0	480
MAR				
09...	0845	3.1	0.0	315
APR				
19...	1805	0.46	17.0	525
20...	0930	0.57	18.0	550
MAY 1989				
10...	0915	0.14	16.0	460
JUN				
01...	1045	58	18.0	205
JUL				
06...	0830	0.03	22.0	520
AUG				
16...	1045	0.02	19.0	530
SEP				
09...	1310	2550	19.0	120

06903400 CHARITON RIVER NEAR CHARITON, IOWA (LAT 40 57 12N LONG 093 15 37W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
11...	1250	0.0	9.0	430
JAN 1989				
06...	1130	0.23	1.5	575
12...	1100	0.17	1.5	650
20...	1045	0.15	0.0	625
27...	1115	0.21	2.0	480
30...	1450	2.0	0.5	500
FEB 1989				
10...	1050	0.22	0.0	600
16...	1145	0.22	0.5	680
24...	0810	0.17	0.0	625
MAR				
20...	1415	2.7	0.5	330
APR				
24...	1345	0.02	28.0	395
MAY				
30...	1130	228	17.0	151

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IOW (LAT 40 48 02N LONG 093 11 32

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
11...	1420	0.22	0.0	450
NOV				
15...	0735	0.43	9.5	550
DEC				
19...	1300	0.31	4.0	690
JAN 1989				
31...	1000	3.1	1.5	500
MAR 1989				
20...	1630	1.9	0.5	315
APR				
24...	1545	0 43	23.0	570
MAY				
30...	1730	26	26.0	238

06903900 CHARITON RIVER NEAR RATHBUN, IOWA (LAT 40 49 22N LONG 092 53 22W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
11...	1550	10	16.5	300
NOV				
15...	0950	6.4	9.0	400
DEC				
19...	1445	8.6	1.5	300
JAN 1989				
31...	1215	2.8	7.5	290
MAR				
21...	0730	1.7	1.0	181
APR 1989				
26...	1010	6.0	12.0	335
MAY				
31...	0930	6.0	21.5	312
JUL				
07...	1130	5.0	22.5	320
AUG				
22...	0750	5.0	23.5	308

06904010 CHARITON R NR MOULTON, IOWA (LAT 40 41 30N LONG 092 46 15W)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)
OCT 1988				
12...	0810	22	8.0	360
NOV				
15...	1230	21	11.0	425
DEC				
20...	0815	29	0.0	350
JAN 1989				
31...	1500	22	7.5	440
MAR				
21...	1020	24	1.0	254
APR 1989				
25...	1710	21	25.0	440
MAY				
31...	1650	72	22.5	290
JUL				
07...	0815	23	26.0	380
AUG				
22...	1055	24	23.5	368

AUDUBON COUNTY

413044094565601. Local number, 78-36-35 ADCC1.
LOCATION.--Lat 41°30'44", long 94°56'56", Hydrologic Unit 10240003, 2.5 mi south of the Town of Brayton on Hwy 71, and 0.3 mi west on the north side of County Road F-67. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 115 ft, cased to 115 ft, slotted from 94-101 ft, gravel-packed.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,230 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.15 ft above land-surface datum.
REMARKS.--Well WC-69.
PERIOD OF RECORD.--June 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 43.55 ft below land-surface datum, January 14, 1987; lowest measured, 53.09 ft below land-surface datum, July 5, 1989.

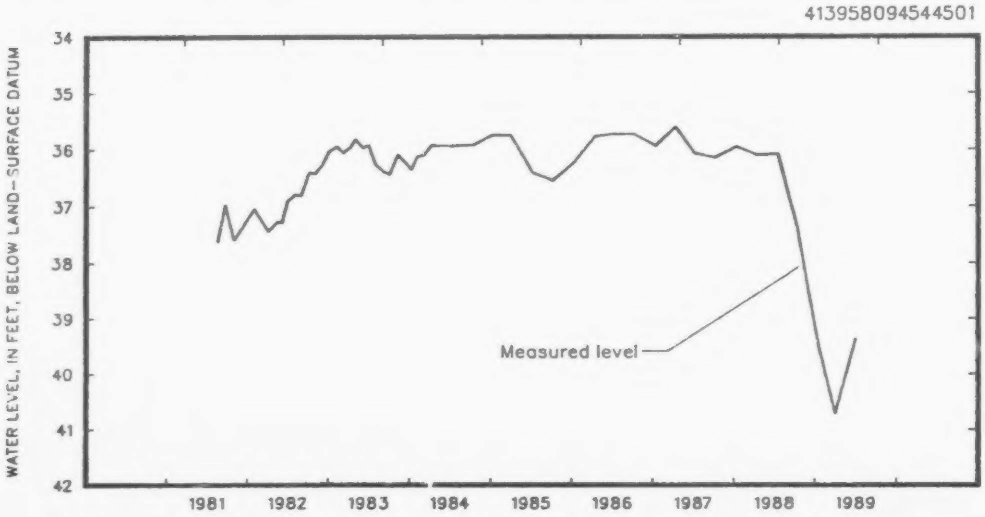
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 22, 1982	53.04	JUN 06,	48.83	OCT 17,	46.75	JUL 09,	45.02
JUL 02	52.99	JUL 01	47.89	JAN 09, 1985	47.72	OCT 09	46.02
AUG 03	53.05	AUG 02	47.74	APR 02	48.49	JAN 14, 1988	47.52
SEP 01	53.03	SEP 06	47.95	JUL 11	49.45	APR 12	48.70
OCT 07	52.94	OCT 03	48.16	OCT 09	50.49	JUL 20	50.13
NOV 04	52.93	NOV 10	48.72	JAN 08, 1986	51.23	OCT 19	51.38
DEC 07	52.81	JAN 10, 1984	49.40	APR 19	50.32	JAN 20, 1989	52.30
JAN 04, 1983	52.40	FEB 06	49.52	JUL 09	47.43	APR 05	52.72
MAR 09	51.29	MAR 06	49.20	OCT 06	44.23	JUL 05	53.09
APR 11	51.20	APR 10	48.77	JAN 14, 1987	43.55		
MAY 03	49.54	JUL 10	45.49	APR 15	45.01		

413958094544501. Local number, 79-35-10 CABB
LOCATION.--Lat 41°39'58", long 94°54'45", Hydrologic Unit 10240003, approximately 0.3 mi west of the Town of Hamlin, on the south side of Highway 44. Owner: Geological Survey Bureau/DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 221 ft, cased to 210 ft, slotted from 168-188 ft, open hole 210-221 ft, gravel-packed.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,280 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.
REMARKS.--Well WC-17
PERIOD OF RECORD.--August 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 35.60 ft below land-surface datum, April 15, 1987; lowest measured, 40.71 ft below land-surface datum, April 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 20, 1981	37.62	JAN 04, 1983	36.03	MAR 06	36.09	APR 15	35.60
SEP 24	36.97	FEB 08	35.94	APR 10	35.92	JUL 09	36.07
NOV 03	37.59	MAR 09	36.06	JUL 10	35.94	OCT 09	36.15
FEB 01, 1982	37.04	APR 11	35.95	OCT 17	35.91	JAN 14, 1988	35.95
APR 06	37.44	MAY 03	35.82	JAN 09, 1985	35.74	APR 12	36.10
MAY 17	37.27	JUN 06	35.97	APR 02	35.75	JUL 20	36.08
JUN 07	37.28	JUL 01	35.92	JUL 09	35.72	OCT 19	37.43
JUL 02	36.90	AUG 02	36.27	OCT 09	36.55	JAN 20, 1989	39.47
AUG 03	36.79	SEP 06	36.39	JAN 08, 1986	36.24	APR 05	40.71
SEP 01	36.81	OCT 03	36.44	APR 19	35.76	JUL 05	39.37
OCT 07	36.40	NOV 10	36.09	JUL 09	35.72		
NOV 04	36.42	JAN 10, 1984	36.35	OCT 09	35.73		
DEC 07	36.25	FEB 06	36.12	JAN 14, 1987	35.94		

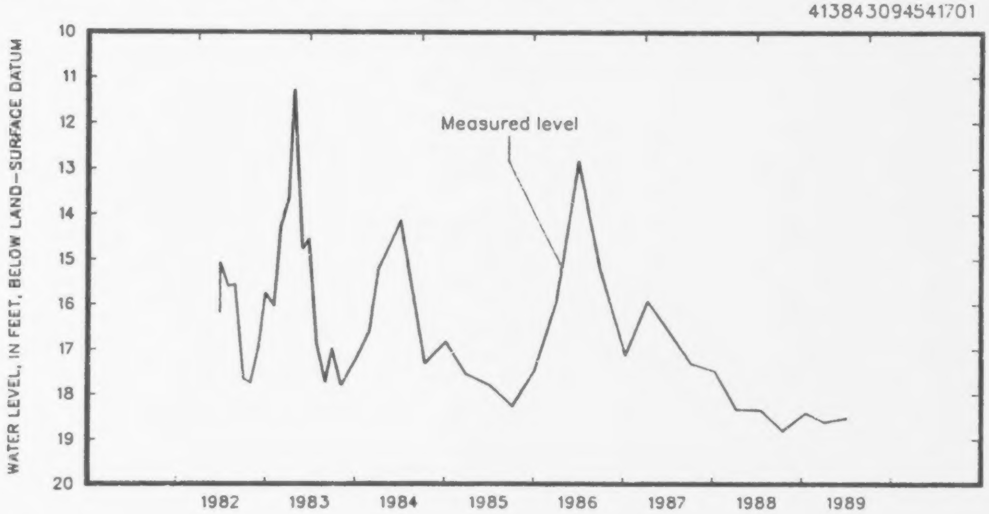


AUDUBON COUNTY

413843094541701. Local number, 79-35-15 DCDD
LOCATION.--Lat 41°38'43", long 94°54'17", Hydrologic Unit 10240003, approximately 1.5 mi south of the Town of Hamlin and 0.5 mi west of Highway 71. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.-- East Nishnabotna alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 32 ft, cased to 30 ft, slotted from 25-30 ft, open hole 30-32 ft, gravel-packed.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,245 ft above National Geodetic Vertical Datum of 1929, from from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.
REMARKS.--Well WC-75
PERIOD OF RECORD.--June 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.28 ft below land-surface datum, May 3, 1983; lowest measured, 18.81 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 29, 1982	16.17	MAY 03	11.28	JUL 10	14.13	APR 15	15.92
JUL 01	15.07	JUN 06	14.75	OCT 17	17.30	JUL 09	16.58
AUG 03	15.59	JUL 01	14.54	JAN 09, 1985	16.82	OCT 09	17.31
SEP 01	15.55	AUG 02	16.87	APR 02	17.54	JAN 14, 1988	17.48
OCT 07	17.66	SEP 06	17.71	JUL 11	17.80	APR 12	18.33
NOV 04	17.74	OCT 03	16.98	OCT 09	18.26	JUL 20	18.34
DEC 07	16.93	NOV 10	17.79	JAN 08, 1986	17.46	OCT 19	18.81
JAN 04, 1983	15.75	JAN 10, 1984	17.19	APR 09	15.90	JAN 20, 1989	18.40
FEB 08	16.03	FEB 06	16.89	JUL 09	12.83	APR 05	18.61
MAR 09	14.24	MAR 06	16.53	OCT 06	15.26	JUL 05	18.51
APR 11	13.61	APR 10	15.19	JAN 14, 1987	17.12		



415023094593801. Local number, 81-36-12 CBCA
LOCATION.--Lat 41°50'23", long 94°59'38", Hydrologic Unit 10240002, approximately 0.5 mi west of the Town of Gray on the east side of County Road N-14, south of the Gray Cemetary. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 315 ft, cased to 315 ft, slotted from 279-295 ft, gravel-packed.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,393 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.
REMARKS.--Well WC-18.
PERIOD OF RECORD.--August 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 160.69 ft below land-surface datum, December 7, 1983; lowest measured, 168.52 ft below land-surface datum, October 6, 1987.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

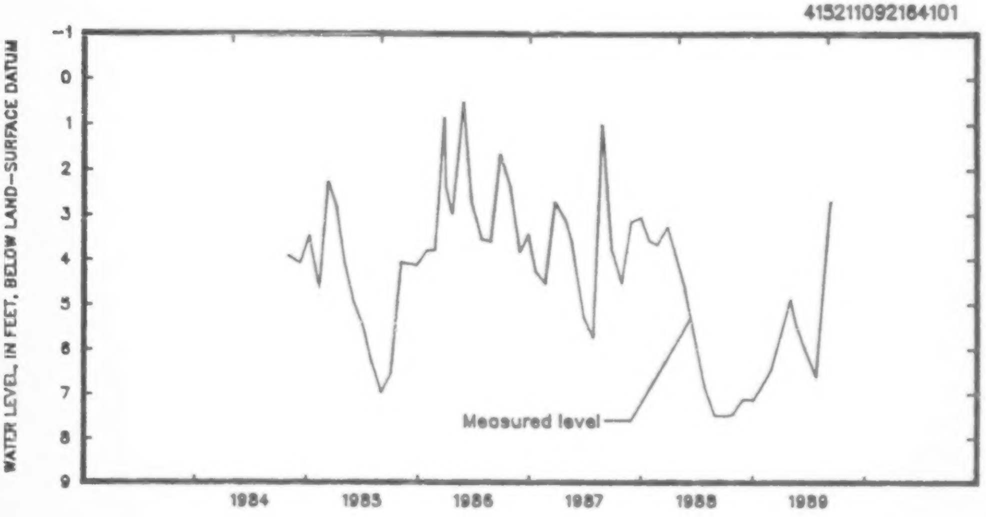
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 19, 1981	166.90	JAN 04, 1983	165.15	FEB 08	164.23	JAN 14, 1987	163.30
SEP 24	165.80	FEB 08	165.21	MAR 05	164.38	APR 16	163.01
NOV 03	165.79	MAR 09	164.91	APR 03	164.67	JUL 09	163.24
FEB 01, 1982	165.68	APR 11	164.67	JUL 13	163.83	OCT 06	168.52
APR 06	165.72	MAY 03	164.73	OCT 17	163.88	JAN 13, 1988	163.20
MAY 06	165.52	JUN 07	164.61	JAN 08, 1985	163.75	APR 12	162.55
JUN 07	165.48	JUL 07	164.69	APR 03	163.74	JUL 19	160.32
JUL 02	165.47	AUG 02	164.89	JUL 09	163.69	OCT 18	163.65
AUG 03	165.50	SEP 06	165.04	OCT 08	163.83	JAN 17, 1989	163.52
SEP 01	165.49	OCT 03	165.72	JAN 07, 1986	163.83	APR 03	163.55
OCT 07	165.40	NOV 07	164.70	APR 09	163.51	JUL 12	164.25
NOV 04	165.12	DEC 07	160.69	JUL 08	163.05		
DEC 10	165.39	JAN 09, 1984	164.37	OCT 07	163.28		

BENTON COUNTY

415211092164101. Local number, 82-12-31 DAAD1.
LOCATION.--Lat 41°52'11", long 92°16'41", Hydrologic Unit 07080208, approximately 0.6 mi north of the Iowa River, west side of Iowa Highways 21 and 212, approximately 1.2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 26 ft, cased to 23 ft, screen 23 to 26 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 770 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3 ft above land-surface datum.
REMARKS.--Well IRA-16A.
PERIOD OF RECORD.--October 1984 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.52 ft below land-surface datum, May 28, 1986; lowest measured, 7.50 ft below land-surface datum, October 6, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	7.50	JAN 03	7.13	MAY 04	4.89	JUL 27	6.62
27	7.45	26	6.87	24	5.48	SEP 13	2.70
NOV 28	7.12	MAR 02	6.45	JUN 20	6.00		



415211092164102. Local number, 82-12-31 DAAD2.
LOCATION.--Lat 41°52'11", long 92°16'41", Hydrologic Unit 07080208, approximately 0.6 mi north of the Iowa River, west side of Iowa Highways 21 and 212, approximately 1.2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 15 ft, cased to 12 ft, slotted 12 to 15 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 770 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.92 ft above land-surface datum.
REMARKS.--Well IRA-16B.
PERIOD OF RECORD.--October 1984 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.48 ft below land-surface datum, May 28, 1986; lowest measured, 7.54 ft below land-surface datum, August 29, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

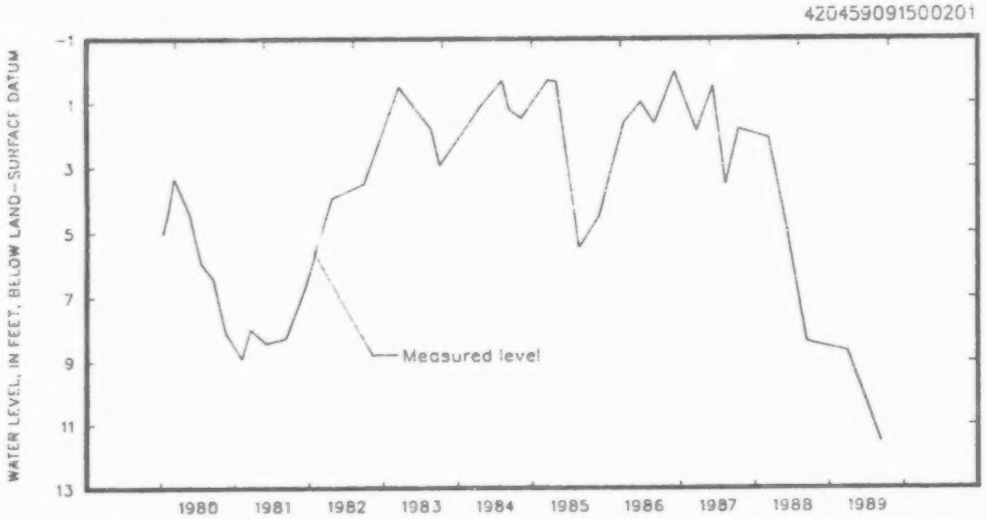
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	7.52	JAN 03	7.18	MAY 04	4.94	JUL 27	6.67
27	7.49	26	6.91	24	5.55	SEP 13	2.90
NOV 28	7.17	MAR 02	6.51	JUN 20	6.06		

BENTON COUNTY

420459091500201. Local number, 84-09-13 DADD1.
LOCATION.--Lat 42°04'56", long 91°50'02", Hydrologic Unit 07080205, approximately 1.75 mi southeast of the Town of Shellsburg, north of the Chicago, Rock Island and Pacific Railroad tracks. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5", depth 421 ft, cased to 35 ft and 163.5-184 ft, open hole 35-163.5 ft and 184-421 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.23 ft above land-surface datum.
REMARKS.--Shellsburg Quarry/Flood Hole. Records for November 1975 to September 1988 are on file in the Iowa District Office.
PERIOD OF RECORD.--November 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +0.65 ft above land-surface datum, April 3, 1979; lowest measured, 12.40 ft below land-surface datum, July 16, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	8.47	MAR 30	8.71	JUN 14	10.01	SEP 11	11.59



420319091540102. Local number, 84-09-28 DBCC2.
LOCATION.--Lat 42°03'19", long 91°54'01", Hydrologic Unit 07080205, approximately 3 mi south and 1.5 mi west of the Town of Shellsburg. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artersian water well, diameter 7 in. to 173 ft, 5 in. to 590 ft, depth 590 ft, cased to 260 ft, open hole 265-590 ft. Cement plug 260-265 ft. Well open to 59.7 ft of Devonian rock reported to yield little, if any, water.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 915 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.28 ft above land-surface datum.
REMARKS.--Parker's Grove Cemetery well.
PERIOD OF RECORD.--April 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 150.73 ft below land-surface datum, April 14, 1975; lowest measured, 167.63 ft below land-surfae datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	165.41	MAR 30	165.58	JUN 14	166.12	SEP 11	167.63

BENTON COUNTY

420731092083801. Local number, 85-11-33 CCBC1.
LOCATION.--Lat 42°07'31", long 92°08'38", Hydrologic Unit 07080205, approximately 1 mi south of the Town of Garrison, just east of County Road V-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Devonian: in Cedar Valley limestone of Middle Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 0.75 in., depth 237 ft, cased to 170 ft, slotted below cement plug, open hole 170 to 237 ft. Cement plugs from 97-100 ft and 237-240 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 905 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of 6 in. casing, 2.20 ft above land-surface datum.
REMARKS.--Garrison 170 well.
PERIOD OF RECORD.--June 1977 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.18 ft below land-surface datum, April 19, 1983; lowest measured, 64.96 ft below land-surface datum, October 12, 1988.

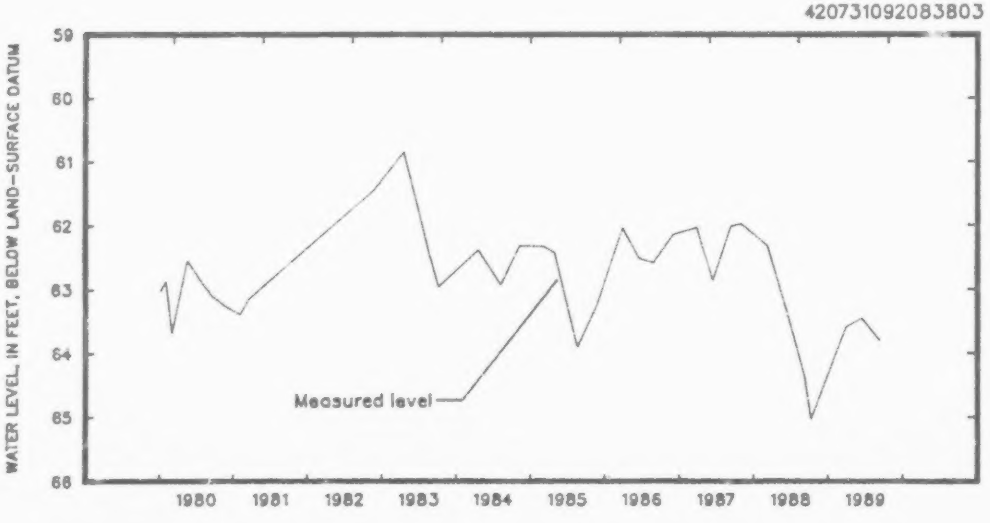
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	64.96	MAR 30	63.08	JUN 14	63.39	SEP 11	63.76

420731092083803. Local number, 85-11-33 CCBC3.
LOCATION.--Lat 42°07'31", long 92°08'38", Hydrologic Unit 07080205, approximately 1 mi south of the Town of Garrison, just east of County Road V-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Devonian: in Cedar Valley limestone of Middle Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 97 ft, cased to 90 ft, open hole 90 to 97 ft. Cement plug from 97-100 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 905 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of 6 in. casing, 2.20 ft above land-surface datum.
REMARKS.--Garrison 109 well.
PERIOD OF RECORD.--June 1977 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.63 ft below land-surface datum, March 23, 1979; lowest measured, 65.03 ft below land-surface datum, October 12, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	65.03	MAR 30	63.59	JUN 14	63.46	SEP 11	63.82

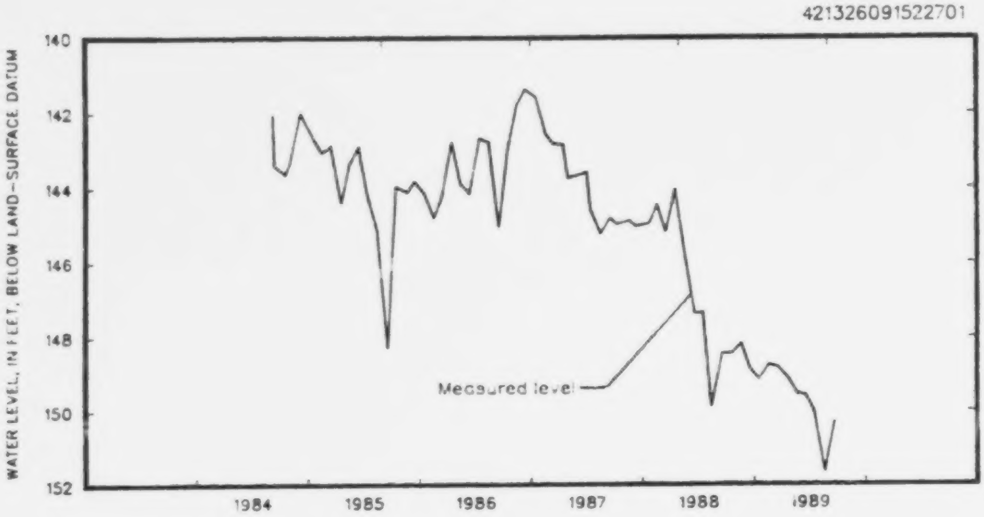


BENTON COUNTY

421326091522701. Local number, 86-09-34 AAAD1.
LOCATION.--Lat 42°13'29", long 91°52'19", Hydrologic Unit 07080205, next to the water tower in the Town of Urbana. Owner: Town of Urbana.
AQUIFER.--Ordovician and Silurian-Devonian: open from limestone and dolomite of the Platteville formation into limestone of Devonian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 1,033 ft, cased to 142 ft, open hole 142-1,033 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 3.15 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--September 1984 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 141.37 ft below land-surface datum, December 17, 1986; lowest measured, 151.64 ft below land-surface datum, August 24, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	148.42	JAN 20	149.14	APR 27	149.12	JUL 21	150.03
NOV 23	148.17	FEB 22	148.73	MAY 26	149.53	AUG 24	151.64
DEC 21	148.84	MAR 23	148.81	JUN 23	149.58	SEP 25	150.30



BUENA VISTA COUNTY

423618095194511. Local number, 90-38-16 DDDD11.
LOCATION.--Lat 42°36'18", long 95°19'45", Hydrologic Unit 10230005, north of County Highway C-65, 2 mi east of the Village of Hanover. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 497 ft, cased to 497 ft, perforated 346.5-349.5 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,365 ft above National Geodetic Vetical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.
REMARKS.--Well D-25.
PERIOD OF RECORD.--April 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.17 ft below land-surface datum, August 12, 1988; lowest measured, 189.53 ft below land-surface datum, December 6, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	187.32	MAR 28	187.48	MAY 23	187.95	AUG 30	188.12

BUENA VISTA COUNTY

424023095571401. Local number, 91-35-26 BCCC1.
LOCATION.--Lat 42°40'23", long 94°57'14", Hydrologic Unit 07100006, approximately 2.7 mi west and 0.5 mi north of the Village of Varina. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 357 ft, cased to 357 ft, perforated 338-347 ft. Paleozoic rock present at 347 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,291 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.
REMARKS.--Well D-24.
PERIOD OF RECORD.--December 1979 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.40 ft below land-surface datum, January 7, 1980; lowest measured, 58.80 ft below land-surface datum, August 30, 1989.

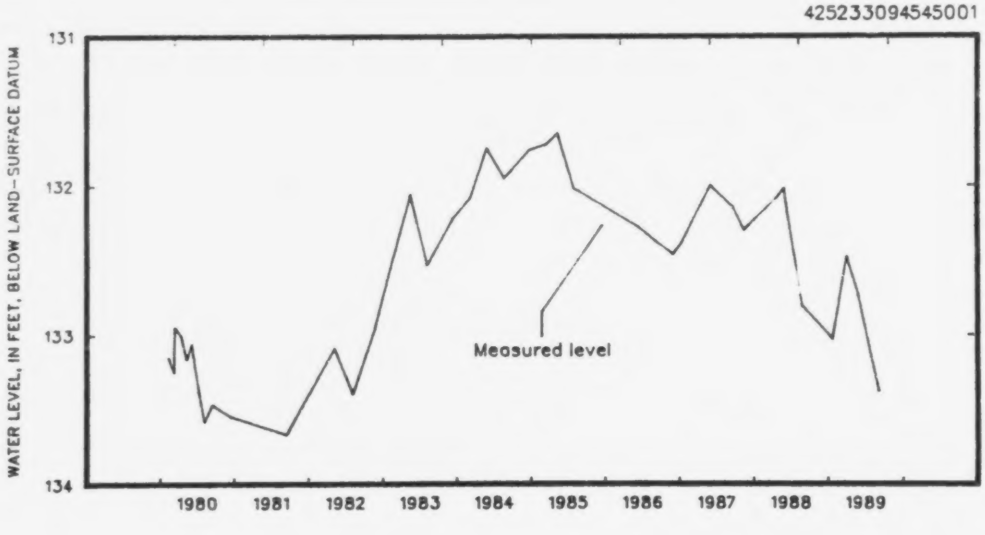
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	56.76	MAR 22	57.65	JUN 06	58.11	AUG 30	58.80

425233094545001. Local number, 93-35-13 ADAA1.
LOCATION.--Lat 42°52'33", long 94°54'50", Hydrologic Unit 07100006, south of the Chicago, Rock Island and Pacific Railroad track, approximately 3.5 mi east and 0.75 mi north of the Town of Marathon. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 1.50 in., depth 381 ft, cased to 381 ft, perforated 350-360 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,330 ft above National Geodetic Vetrical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.
REMARKS.--Well D-36.
PERIOD OF RECORD.--February 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 131.65 ft below land-surface datum, May 6, 1985; lowest measured, 133.67 ft below land-surface datum, September 11, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	133.03	MAR 29	132.48	MAY 23	132.73	SEP 01	133.38



CARROLL COUNTY

420705094394501. Local number, 84-33-02 BDBA1.
LOCATION.--Lat 42°07'05", long 94°39'45", Hydrologic Unit 07100006, 3.75 mi north and 3.25 mi east of the Town of Glidden, east of County Road N-50 and the Kendal Bridge. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., cased to 76 ft, slotted from 73-76 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,110 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.
REMARKS.--Well WC-132.
PERIOD OF RECORD.--September 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 49.24 ft below land-surface datum, July 12, 1984; lowest measured, 56.14 ft below land-surface datum, July 12, 1989.

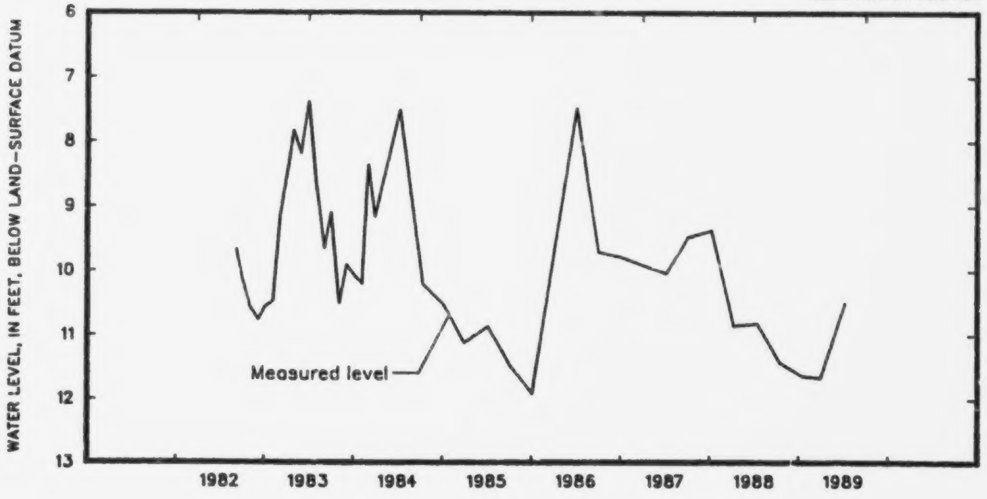
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 09, 1982	54.40	SEP 08	51.95	APR 02	52.11	JAN 12, 1988	53.48
OCT 06	54.58	OCT 05	51.78	JUL 08	53.04	APR 12	53.80
NOV 05	54.72	NOV 08	52.22	OCT 07	53.90	JUL 12	54.61
DEC 09	54.57	DEC 07	52.14	JAN 07, 1986	54.30	OCT 18	54.80
JAN 05, 1983	54.74	JAN 09, 1984	52.75	APR 09	54.80	JAN 17, 1989	55.30
MAR 11	54.44	FEB 09	52.30	JUL 08	53.56	APR 03	55.77
APR 13	53.91	MAR 05	52.00	OCT 07	53.00	JUL 12	56.14
MAY 04	53.14	APR 02	51.86	JAN 04, 1987	52.99		
JUN 03	52.29	JUL 12	49.24	APR 16	53.40		
JUL 05	51.99	OCT 16	50.46	JUL 09	53.50		
AUG 03	51.56	JAN 08, 1985	51.40	OCT 06	53.06		

420643094403701. Local number, 84-33-03 CADA1.
LOCATION.--Lat 42°06'43", long 94°40'37", Hydrologic Unit 07100006, 3.5 mi north and 2.5 mi east of the Town of Glidden, on the west side of County Road N-50. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--North Raccoon terrace: in terrace sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 21 ft, cased to 15 ft, slotted from 13-15 ft, gravel-packed. Glacial till penetrated 15-21 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.31 ft above land-surface datum.
REMARKS.--Well WC-131.
PERIOD OF RECORD.--September 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.39 ft below land-surface datum, July 5, 1983; lowest measured, 11.92 ft below land-surface datum, January 7, 1986.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 09, 1982	9.67	AUG 03	8.58	JAN 08, 1985	10.54	OCT 06	9.48
OCT 07	10.17	SEP 08	9.66	APR 02	11.13	JAN 12, 1988	9.37
NOV 05	10.57	OCT 05	9.11	JUL 08	10.87	APR 12	10.86
DEC 09	10.77	NOV 08	10.51	OCT 07	11.48	JUL 18	10.82
JAN 05, 1983	10.57	DEC 07	9.92	JAN 07, 1986	11.92	OCT 18	11.43
FEB 09	10.47	JAN 09, 1984	10.09	APR 09	9.68	JAN 17, 1989	11.64
MAR 11	9.13	FEB 09	10.21	JUL 08	7.49	APR 03	11.67
APR 13	8.37	MAR 05	8.37	OCT 07	9.72	JUL 12	10.50
MAY 04	7.84	APR 02	9.17	JAN 14, 1987	9.81		
JUN 03	8.19	JUL 12	7.52	APR 16	9.94		
JUL 05	7.39	OCT 16	10.22	JUL 09	10.05		

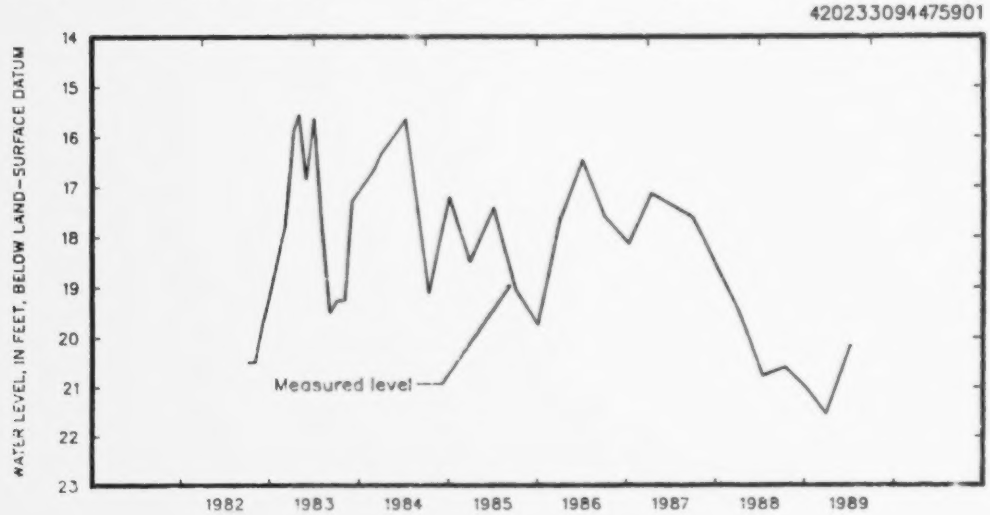


CARROLL COUNTY

420233094475901. Local number, 83-35-34 BCDC1.
LOCATION.--Lat 42°02'33", long 94°47'59", Hydrologic Unit 07100007, approximately 3.5 mi west and 1.5 mi south of the Town of Glidden near the airport, west of County Road N-38. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 100 ft, cased to 99 ft, slotted from 72-76 ft; gravel packed, open hole 99-100 ft. Pennsylvanian rock 80-100 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,225 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.40 ft above land-surface datum.
REMARKS.--Well WC-148.
PERIOD OF RECORD.--October 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.56 ft below land-surface datum, May 4, 1983; lowest measured, 21.54 ft below land-surface datum, April 3, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06, 1982	20.50	SEP 08	19.49	JUL 08	17.42	JAN 12, 1988	18.61
NOV 05	20.50	OCT 05	19.26	OCT 07	19.04	APR 12	19.50
DEC 09	19.67	NOV 08	19.23	JAN 07, 1986	19.74	JUL 18	20.77
JAN 05, 1983	19.17	DEC 08	17.27	APR 09	17.63	OCT 18	20.59
MAR 10	17.79	MAR 06	16.64	JUL 08	16.47	JAN 17, 1989	21.04
APR 13	15.84	APR 02	16.34	OCT 07	17.59	APR 03	21.54
MAY 04	15.56	JUL 13	15.65	JAN 14, 1987	18.13	JUL 12	20.15
JUN 03	16.84	OCT 16	19.10	APR 16	17.13		
JUL 05	15.64	JAN 08, 1985	17.21	JUL 09	18.98		
AUG 03	17.58	APR 02	18.49	OCT 05	17.62		



420335094521501. Local number, 84-35-25 BDAD1.
LOCATION.--Lat 42°03'35", long 94°52'15", Hydrologic Unit 07100007, near the city water plant, Carroll. Owner: City of Carroll.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 120 ft, cased to 100 ft, open hole 100-120 ft.
METHOD.--Intermittent measurement reported by personnel from the City of Carroll.
DATUM.--Elevation of land-surface datum is 1,275 ft above National Geodetic Vetrical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.
REMARKS.--City test No. 1. Water levels affected by pumping of nearby wells.
PERIOD OF RECORD.--September 1939 to December 1949, May 1952 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.55 ft below land-surface datum, September 8, 1945; lowest measured, 87.50 ft below land-surface datum, June 13, 1981.
REVISION.--Lowest water level measured, 87.50 ft below land-surface datum, Jun. 13, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 05	66.00	APR 21	70.33	JUN 15	67.19	AUG 12	73.60
NOV 15	66.76	25	69.02	20	68.64	15	73.30
DEC 01	63.48	28	67.55	25	67.41	18	72.80
30	62.90	30	64.90	30	69.03	20	68.90
JAN 04	62.75	MAY 05	65.09	JUL 05	67.50	24	73.40
17	66.10	10	66.76	10	73.80	25	71.30
FEB 14	62.48	15	69.32	15	73.40	28	68.10
MAR 08	62.79	20	68.31	20	73.00	SEP 01	72.20
23	62.76	25	67.53	25	70.30		
APR 05	62.68	31	66.88	31	71.30		
11	62.45	JUN 05	66.50	AUG 05	74.30		
APR 17	65.00	10	69.82	10	71.00		

CARROLL COUNTY

421058094582701. Local number, 85-35-07 CCCC1.
LOCATION.--Lat 42°10'58", long 94°58'27", Hydrologic Unit 07100006, approximately 1 block north of Iowa Highway 217, next to the town maintenance building, Breda. Owner: Town of Breda.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 10 in., depth 340 ft, cased to 320 ft, screen 320-340 ft. Original depth 349 ft.
METHOD.--Quarterly measurement with chalked taped by USGS personnel.
DATUM.--Elevation of land surface datum is 1,262 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Vent pipe, 1.60 ft above land-surface datum.
REMARKS.--Town well No. 3. Water levels affected by pumping.
PERIOD OF RECORD.--March 1942 to August 1966, March 1968 to November 1971, June 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.70 ft below land-surface datum, Mar. 25, 1948; lowest measured, 250.40 ft below land surface datum, May 24, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

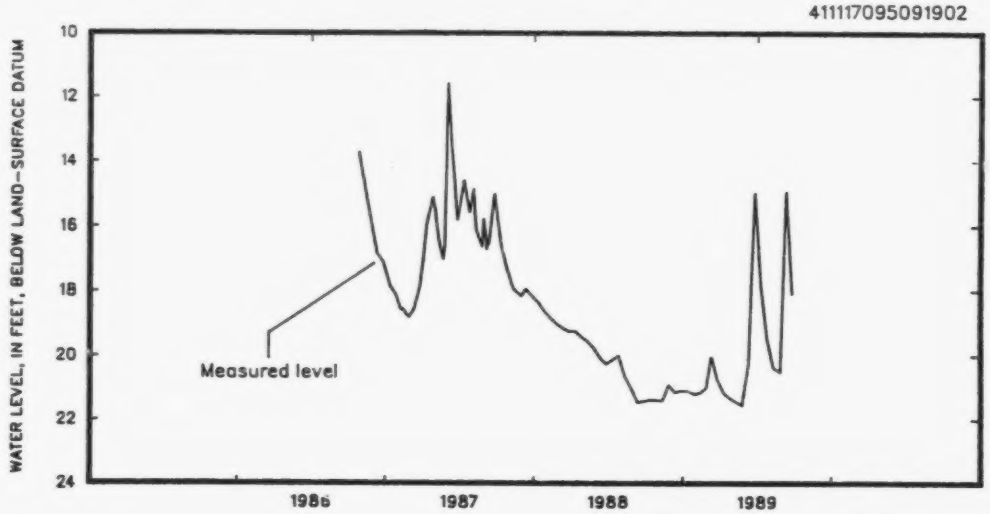
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 29	204.36	MAR 29	201.34	JUL 13	200.[illegible]7

CASS COUNTY

411117095091902. Local number, 74-37-30 BBBB2.
LOCATION.--Lat 41°11'17", long 95°09'19", Hydrologic Unit 10240003, approximately 3 mi south of the Town of Griswold, and 1 mi west of Highway 48 on the Pottawattamie County-Cass County border. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--East Nishnabotna alluvial, in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 70 ft, cased to 70 ft, slotted 69-70 ft, gravel packed.
METHOD.--Twice-a-month measurement with chalked tape by observer.
DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.
REMARKS.--Well SW-16B(L).
PERIOD OF RECORD.--July 1986 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.62 ft below land surface datum, June 1, 1987; lowest measured, 21.59 ft below land-surface datum, May 25, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1985 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 21, 1986	16.02	JUL 25	15.60	MAR 10	19.18	MAR 25	20.80
AUG 07	17.48	AUG 03	14.90	25	19.29	APR 10	21.21
12	17.96	10	16.16	APR 10	19.27	25	21.37
OCT 23	13.75	25	16.67	25	19.46	MAY 10	21.48
DEC 09	16.88	26	16.58	MAY 10	19.58	25	21.59
24	17.15	28	15.82	25	19.79	JUN 10	20.28
JAN 10, 1987	17.88	30	15.97	JUN 10	20.10	25	15.00
25	18.17	SEP 01	16.16	25	20.30	JUL 10	17.84
FEB 05	18.60	03	16.42	JUL 10	20.16	JUL 25	19.48
10	18.59	05	16.74	25	20.03	AUG 10	20.41
25	18.85	07	16.40	AUG 10	20.69	27	20.56
MAR 10	18.59	10	16.60	27	21.10	SEP 10	14.97
25	17.86	24	15.05	SEP 10	21.50	25	18.13
APR 01	17.16	OCT 10	16.57	25	21.45		
10	15.98	12	16.70	OCT 10	21.40		
25	15.15	25	17.36	25	21.43		
MAY 01	15.55	NOV 05	17.80	NOV 10	21.45		
10	16.44	10	17.97	25	20.94		
21	17.05	29	18.20	DEC 10	21.18		
25	16.57	DEC 10	17.97	26	21.12		
JUN 01	11.62	25	18.18	JAN 10, 1989	21.14		
10	13.60	JAN 11, 1988	18.40	28	21.24		
25	15.84	26	18.67	FEB 10	21.19		
JUL 07	14.90	FEB 10	18.89	26	21.02		
10	14.64	25	19.06	MAR 10	20.07		



CERRO GORDO COUNTY

430757093131801. Local number, 96-20-17 DAAD1.

LOCATION.--Lat 43°07'57", long 93°13'18", Hydrologic Unit 07080203, in southwest Mason City, 1 mi west of Highway 65 and south of the Iowa Terminal Railyard. Owner: AMPI Creamery (formerly State Brand Creameries).

AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandy dolomite of Early Orodovician age.

WELL CHARACTERISTICS.--Unused drilled industrial artesian water well, diameter 10 in., depth 1,336 ft, cased from 0-1,080 ft, open hole from 1,080-1,336 ft.

METHOD.--Quarterly measurement with electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,162 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.30 ft above land-surface datum.

REMARKS.--State Brand Creameries Well #1. Records for 1968-1971 and 1973-1975 are available in the files of the Iowa District Office.

PERIOD OF RECORD.--October 1968 to 1971, and March 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 170.80 ft below land-surface datum, August 4, 1977; lowest measured, 298.80 ft below land-surface datum, October 22, 1968.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1975 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 17, 1976	265.80	NOV 07	254.88	FEB 10, 1983	260.17	MAY 09	256.37
FEB 15, 1977	266.60	FEB 04, 1980	254.93	MAY 24	261.20	AUG 04	247.89
MAR 16	241.22	MAY 20	255.50	AUG 01	273.42	OCT 25	256.78
MAY 12	189.40	AUG 11	255.75	NOV 01	261.63	JAN 12, 1987	230.75
AUG 04	170.80	NOV 04	254.60	FEB 02, 1984	260.78	JUN 29	273.14
NOV 07	170.90	JAN 27, 1981	254.53	JUL 11	255.70	APR 19, 1988	228.08
FEB 15, 1978	196.00	JUN 04	271.50	SEP 26	268.12	MAY 31	227.89
MAY 23	258.57	AUG 26	258.45	DEC 28	257.87	AUG 17	280.27
AUG 22	249.30	NOV 19	268.80	MAR 18, 1985	250.82	DEC 28	277.81
NOV 08	251.60	FEB 12, 1982	265.05	JUL 10	252.15	MAR 20, 1989	258.12
FEB 14, 1979	255.60	MAY 06	259.45	OCT 16	251.02	JUN 13	278.26
MAY 23	254.10	JUL 30	264.20	DEC 05	257.83	SEP 06	267.61
AUG 30	252.20	NOV 01	264.65	FEB 19, 1986	257.57		

430806093164501. Local number, 96-21-13 BCCB1.

LOCATION.--Lat 43°08'06", long 93°16'45", Hydrologic Unit 07080203, south of the County Home, just north of Iowa Highway 106, east of the City of Clear Lake. Owner: Mason City and Clear Lake Railroad.

AQUIFER.--Devonian: in Cedar Valley limestone of Middle Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 198 ft. Casing information is not available.

METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of well curb, 1.30 ft above land-surface datum.

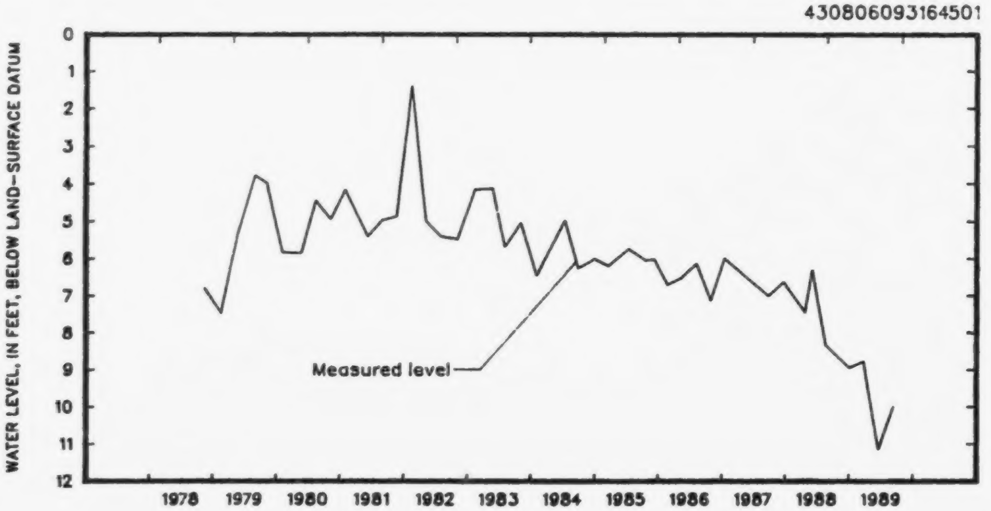
REMARKS.--None.

PERIOD OF RECORD.--November 1940 to August 1971, March 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.73 ft below land-surface datum, January 28, 1951; lowest measured, 17.26 ft below land-surface datum, November 18, 1955.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	8.98	MAR 20	8.80	JUN 13	11.17	SEP 06	10.01



CERRO GORDO COUNTY

430658093281001. Local number, 96-22-20 CADC1.
LOCATION.--Lat 43°06'58", long 93°28'10", Hydrologic Unit 07080203, east of County Road S-14 in Ventura Heights. Owner: W. Blaine and H. Elder.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 126 ft. Casing information is not available.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,249 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in side of casing, 0.87 ft above land-surface datum.
REMARKS.--Formerly Boy Scouts of America.
PERIOD OF RECORD.--July 1940 to August 1971, March 1973 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.65 ft below land-surface datum, March 25, 1942; lowest measured, 55.49 ft below land-surface datum, March 20, 1989.

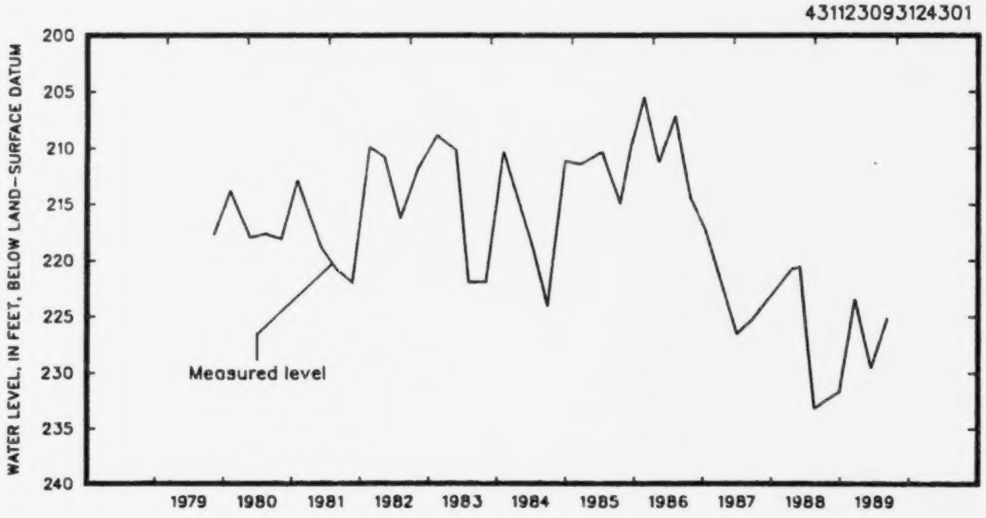
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL
Dec 28	50.58	Mar 20	55.49

431123093124301. Local number, 97-20-28 CAAC1.
LOCATION.--Lat 43°11'23", long 93°12'43", Hydrologic Unit 07080203, north of Mason City at the southwest corner of the junction of Highway 65 and County Road D-20. Owner: American Crystal Sugar Corporation.
AQUIFER.--Cambrian-Ordovician and Devonian: in sandstone of Late Cambrian and Middle Ordovician age and limestone of Devonian age.
WELL CHARACTERISTICS.--Unused industrial drilled artesian waterwell, diameter 20 in., original depth 1,347 ft, back-filled to 1,257 ft in 1932, cased to 241 ft and 653-815 ft, open hole from 241-653 ft and 815-1,257 ft.
METHOD.--Quarterly measurement with electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,127 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.77 ft above land-surface datum.
REMARKS.--Records for 1937 to September 1988 are on file in the Iowa District Office.
PERIOD OF RECORD.--1937 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 148.00 ft below land-surface datum, August 29, 1944; lowest measured, 318.23 ft below land-surface datum, November 6, 1968.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 28	231.67	MAR 20	233.50	JUN 13	229.54	SEP 06	225.17

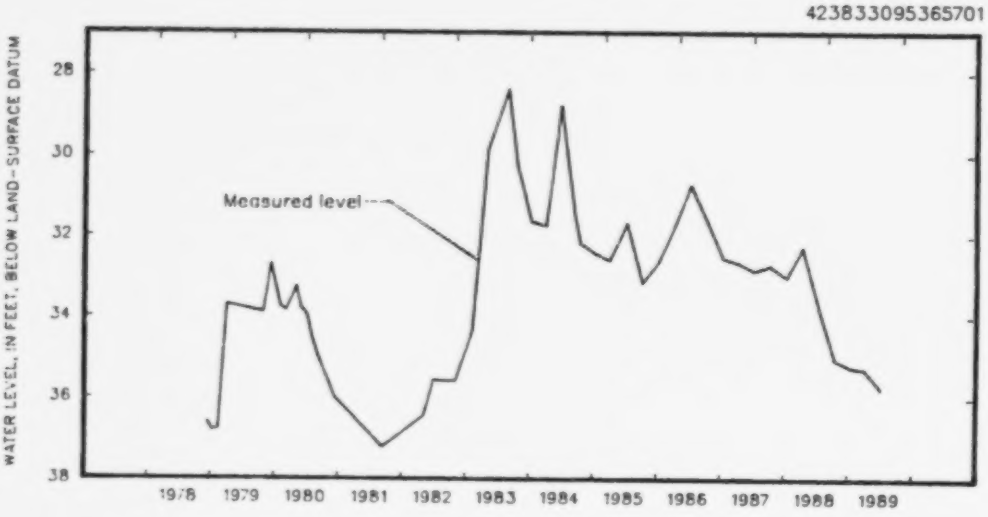


CHEROKEE COUNTY

423833095365701. Local number, 90-40-06 BDCD1.
LOCATION.--Lat 42°38'33", long 95°36'57", Hydrologic Unit 10230003, approximately 3.1 mi west of U.S. Highway 59 and 0.55 mi north of Iowa Highway 31 along the Illinois Central Railroad track. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTFRISTICS.--Drilled observation artesian water well, diameter 1.25 in., depth 253 ft, cased to 252 ft, sandpoint 252-253 ft.
METHOD.--Quarterly measurements with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,182 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.93 ft above land-surface datum.
REMARKS.--Well D-6.
PERIOD OF RECORD.--December 1978 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 28.38 ft below land-surface datum, August 27, 1983; lowest measured, 37.22 ft below land-surface datum, September 10, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	35.04	JAN 19	35.24	APR 04	35.28	JUL 05	35.76



424348095231601. Local number, 91-39-01 ADAD1.
LOCATION.--Lat 42°43'48", long 95°23'16", Hydrologic Unit 10230005, approximately 2 mi east and 0.5 mi north of the Town of Aurelia at the Larson Lake County Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Cambrian-Ordovician: in sandstone of Cambrian age and dolomite of Ordovician age.
WELL CHARACTERISITICS.--Drilled observation artesian water well, diameter 6 in. to 236 ft, 5 in. to 486 ft, 2 in. to 1,545 ft, depth 1,545 ft, cased to 1,126 ft, open hole 1,126 to 1,545 ft.
METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.20 ft above land-surface datum.
REMARKS.--Well D-28.
PERIOD OF RECORD.--September 1979 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 189.65 ft below land-surface datum, December 19, 1984; lowest measured, 194.47 ft below land-surface datum, May 5, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	192.19	MAR 29	192.55	MAY 31	192.95	AUG 30	192.99

CHEROKEE COUNTY

424348095231602. Local number, 91-39-01 ADAD2.
LOCATION.--Lat 42°43'48", long 95°23'16", Hydrologic Unit 10230005, approximately 2 mi east and 0.5 mi north of the Town of Aurelia at the Larson Lake County Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 4 in., depth 340 ft, cased to 340 ft, perforated 235-240 ft.
METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.75 ft above land-surface datum.
REMARKS.--Well D-29.
PERIOD OF RECORD.--September 1979 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 188.65 ft below land-surface datum, April 20, 1988; lowest measured, 194.15 ft below land-surface datum, August 24, 1982.

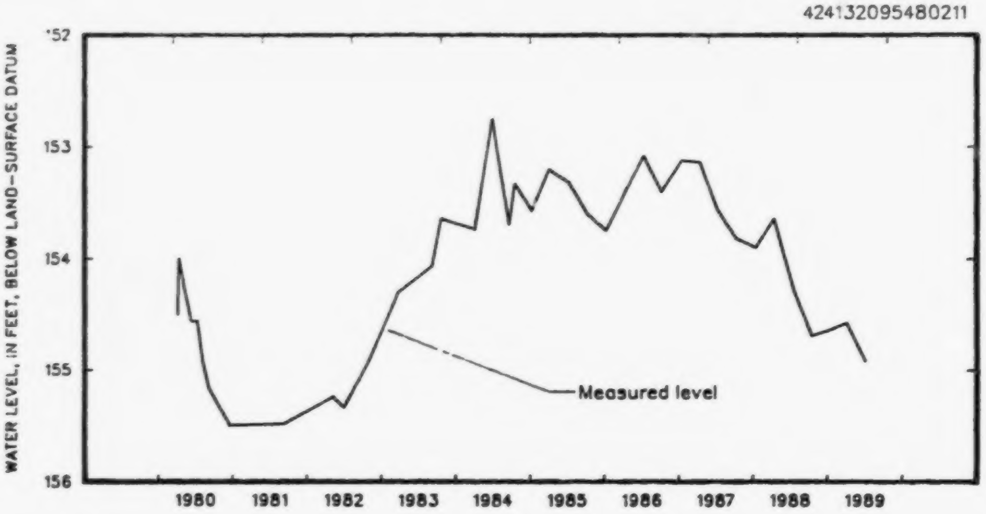
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	189.20	MAR 29	189.50	MAY 31	189.77	AUG 30	189.61

424132095480211. Local number, 91-42-16 DDDD11
LOCATION.--Lat 42°41'32", long 95°48'02", Hydrologic Unit 10230004, approximately 2 mi north of the Village of Fielding at the junction of County Roads L-36 and C-44. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 390 ft, cased to 390 ft, perforated 386-390 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.
REMARKS.--Well D-11.
PERIOD OF RECORD.--March 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.75 ft below land-surface datum, June 27, 1984; lowest measured, 155.50 ft below land-surface datum, December 15, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	154.69	JAN 19	154.63	APR 04	154.57	JUL 05	154.92

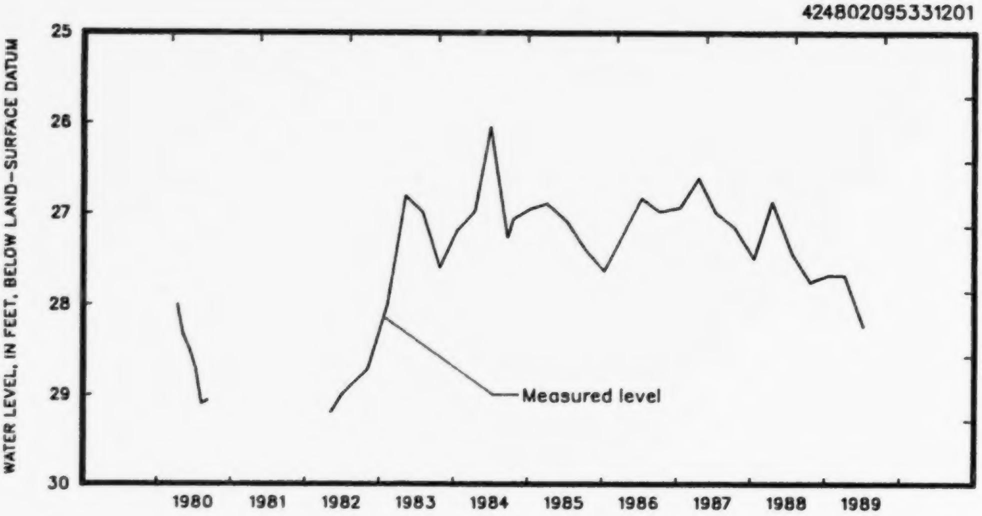


CHEROKEE COUNTY

424802095331201. Local number, 92-40-10 BDDD1.
LOCATION.--Lat 42°48'02", long 95°33'12", Hydrologic Unit 10230003, west of U.S. Highway 59, approximately 2.5 mi north of the City of Cherokee. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 300 ft, cased to 300 ft, perforated 114-118 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,210 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.30 ft above land-surface datum.
REMARKS.--Well D-5.
PERIOD OF RECORD.--April 1980 to October 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 26.05 ft below land-surface datum, June 27, 1984; lowest measured, 29.19 ft below land-surface datum, May 5, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	27.75	JAN 19	27.67	APR 04	27.68	JUL 05	28.24



424459095322411. Local number, 92-40-26 CCDD1.
LOCATION.--Lat 42°44'59", long 95°32'24", Hydrologic Unit 10230003, in the City of Cherokee, to the north of County Road C-38 and east of Highway 59 near the old pumping station. Owner: City of Cherokee.
AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian age and sandy dolomite of Early Ordovician age.
WELL CHARACTERISTICS.--Unused drilled municipal artesian test water well, diameter 8 in., depth 1,055 ft, cased to 965 ft, open hole from 965-1055 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,180 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.53 ft above land-surface datum.
REMARKS.--City of Cherokee Test #1.
PERIOD OF RECORD.--November 1987 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 20.59 ft below land-surface datum, April 12, 1987; lowest measured, 26.28 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1989

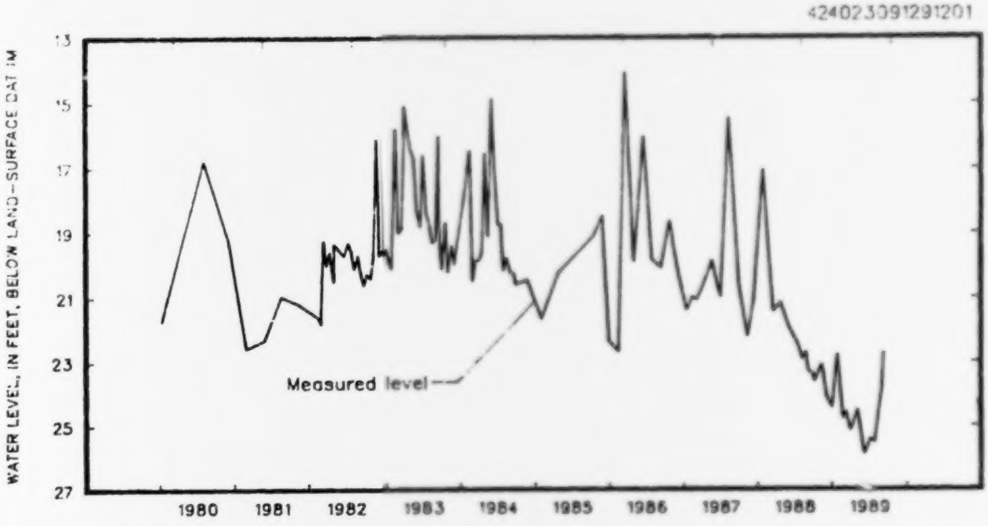
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 05	20.94	OCT 19	26.28	JAN 19	23.16	APR 04	23.03
APR 12	20.59						

CLAYTON COUNTY

424023091291201. Local number, 91-05-30D BBBB1.
LOCATION.--Lat 42°40'23", long 91°29'12", Hydrologic Unit 07060006, 5 mi northwest of the City of Edgewood, or 2 mi northwest of the junction of Iowa Highways 3 and 13, east of Strawberry Point. Owner: Harold Knight.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Dug unused water-table well, diameter 36 in., depth 36 ft. Casing information not available.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,233 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base at land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--June 1957 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 14.06 ft below land-surface datum, March 26, 1986; lowest measured, 30.68 ft below land-surface datum, January 12, 1959.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL
OCT	06	23.40	JAN	05	24.42	APR	05	25.12	AUG	01	25.50
	11	23.59	FEB	01	22.78	MAY	09	24.50	SEP	07	23.79
NOV	15	23.07		28	24.76	JUN	12	25.86		14	22.72
	22	23.30	MAR	14	24.55	JUL	11	25.41			
DEC	12	24.12									

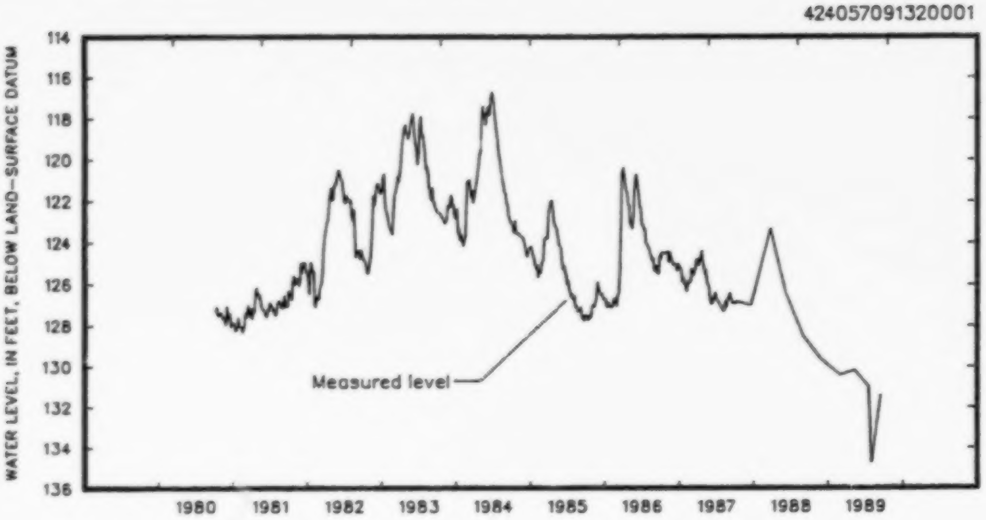


424057091320001. Local number, 91-06-22 ACAC1.
LOCATION.--Lat 42°40'57", long 91°32'00", Hydrologic Unit 07060006, southeast corner of the junction of Iowa Highways 3 and 13, Strawberry Point. Owner: City of Strawberry Point.
AQUIFER.--Ordovician and Silurian: in dolomite of Late Ordovician and Silurian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 16 in., depth 492 ft, cased to 161 ft with 16 in., 12 in. 130-161 ft; 10 in. liner 229-370 ft, open hole 161-229 ft and 370-492 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,219 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 2.10 ft above land-surface datum.
REMARKS.--City well No. 2. Recorder removed October 1987.
PERIOD OF RECORD.--March 1963 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 114.38 ft below land-surface datum, May 9, 1973; lowest recorded, 134.76 ft below land-surface datum, August 1, 1989.

WATER LEVEL, IN FEET, BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL
NOV	22	129.65	MAY	09	130.23	AUG	01	134.76	SEP	14	131.46
FEB	28	130.48	JUL	18	131.07						

CLAYTON COUNTY



430156091182901. Local number, 95-04-22 BCBD1.

LOCATION.--Lat 43°01'56", long 91°18'29", Hydrologic Unit 07060001, approximately 2 mi north of the junction of U.S. Highway 18 and U.S. Highway 52-Iowa Highway 13, near Spock Cave. Owner: Gerald Mielke.

AQUIFER.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 49 ft. Casing information not available.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.00 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--October 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.98 ft below land-surface datum, December 7, 1983; lowest measured, 27.88 ft below land-surface datum, March 4, 1968.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 28	23.94	MAR 07	24.21	MAY 09	23.50	SEP 14	23.79

425940091194701. Local number, 95-04-32 DDDD1.

LOCATION.--Lat 42°59'40", long 91°19'47", Hydrologic Unit 07060004, 1 mi west of the junction of U.S. Highway 52 and Iowa Highway 13, or northeast of the Town of Farmersburg. Owner: Milton and Willis Meier.

AQUIFER.--Cambrian-Ordovician: in St. Perter sandstone of Middle Ordovician age.

WELL CHARACTERISTICS.--Drilled stock artesian water well, diameter 6 in., depth 380 ft (reported). Casing information not available.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in pump base, 1.00 ft above land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--October 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.08 ft below land-surface datum, July 10, 1984; lowest measured, 126.56 ft below land-surface datum, January 13, 1969.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 28	95.30	MAR 07	100.95	MAY 09	99.10	SEP 14	102.34

CRAWFORD COUNTY

415514095312001. Local number, 82-40-17 AABB1.
LOCATION.--Lat 41°55'14", long 95°31'20", Hydrologic Unit 10230007, approximately 1.5 mi west of the Town of Dow City on the south side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 141 ft, cased to 141 ft, slotted from 123-141 ft, gravel-packed.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,150 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.
REMARKS.--Well WC-9.
PERIOD OF RECORD.--June 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.15 ft below land-surface datum, May 3, 1983; lowest measured, 43.86 ft below land-surface datum, June 11, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 11, 1981	43.86	MAY 03	38.15	MAR 20	41.51	JUL 29	40.30
26	43.60	JUN 02	39.61	APR 30	40.83	OCT 16	40.67
JUL 28	43.02	JUL 05	39.15	JUN 11	41.13	NOV 27	40.67
SEP 23	43.62	AUG 02	40.43	JUL 24	41.70	JAN 14, 1988	40.60
NOV 03	43.52	SEP 07	41.32	SEP 30	41.99	FEB 16	40.82
JAN 13, 1982	43.22	OCT 04	39.47	NOV 25	41.98	MAR 30	41.60
APR 06	42.83	NOV 08	41.54	JAN 19, 1986	41.65	MAY 06	41.64
MAY 07	42.50	DEC 08	41.24	FEB 21	41.75	JUN 20	41.60
JUN 04	40.84	JAN 10, 1984	41.15	MAR 19	39.30	AUG 01	41.83
JUL 02	40.65	FEB 06	41.06	MAY 01	40.00	SEP 29	42.30
AUG 03	41.77	MAR 06	41.13	JUN 13	40.77	OCT 17	42.20
SEP 09	42.33	APR 10	39.87	JUL 22	40.87	DEC 02	42.16
OCT 07	41.55	MAY 30	38.27	SEP 05	41.56	JAN 17, 1989	41.65
NOV 01	41.73	JUL 11	39.16	OCT 14	40.35	FEB 16	42.06
DEC 02	41.60	AUG 20	40.64	NOV 19	40.58	APR 06	42.10
JAN 03, 1983	41.17	OCT 03	41.46	JAN 02, 1987	41.15	MAY 18	42.30
FEB 08	40.86	NOV 14	41.18	FEB 25	41.66	JUN 29	42.28
MAR 10	39.34	DEC 27	40.74	MAR 18	41.28	AUG 09	42.56
APR 11	39.06	FEB 04, 1985	40.99	APR 28	40.00	SEP 21	42.24
				JUN 19	40.43		

415512095313801. Local number, 82-40-17 ABBC1.
LOCATION.--Lat 41°55'12", long 95°31'38", Hydrologic Unit 10230007, approximately 1.75 mi west of the Town of Dow City on County Road E-5L, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 46 ft, cased to 46 ft, slotted from 40-46 ft, gravel-packed.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,122 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.
REMARKS.--Well WC-188.
PERIOD OF RECORD.--May 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.55 ft below land-surface datum, May 30, 1984; lowest measured, 26.09 ft below land-surface datum, August 9, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 26, 1983	22.41	OCT 03	24.88	JUN 13	24.01	MAY 06	25.10
JUN 02	22.74	NOV 14	24.69	JUL 22	24.17	JUN 20	25.03
JUL 05	22.27	DEC 27	24.23	SEP 05	24.92	AUG 01	25.37
AUG 02	23.75	FEB 04, 1985	24.33	OCT 14	23.67	SEP 09	25.63
SEP 07	24.21	MAR 20	24.94	NOV 19	24.10	OCT 17	25.78
OCT 04	24.80	APR 30	24.14	JAN 01, 1987	24.71	DEC 02	25.60
NOV 08	24.92	JUN 11	24.83	FEB 25	25.15	JAN 17, 1989	25.17
DEC 08	24.56	JUL 24	25.25	MAR 18	24.86	FEB 16	25.30
JAN 10, 1984	24.45	SEP 03	25.48	JUN 19	23.85	APR 06	25.30
FEB 06	24.44	OCT 16	25.58	JUL 29	23.82	MAY 18	25.85
MAR 06	24.06	NOV 26	25.35	OCT 16	24.15	JUN 29	25.84
APR 10	22.79	JAN 09, 1986	25.90	NOV 27	24.65	AUG 09	26.09
MAY 30	21.55	FEB 21	25.03	JAN 14, 1988	24.75	SEP 21	25.65
JUL 11	22.50	MAR 19	22.26	FEB 16	24.29		
AUG 20	24.29	MAY 01	22.98	MAR 30	25.03		

CRAWFORD COUNTY

420608095111701. Local number, 84-37-08 BCCB1.
LOCATION.--Lat 42°06'08", long 95°11'17", Hydrologic Unit 10230007, approximately 3 mi north of the Town of Vail on the east side of County Road E-25. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 541 ft, cased to 541 ft, slotted from 527-541 ft, gravel-packed. Open to Pennsylvanian limestone 539-541 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,380 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.65 ft above land-surface datum.
REMARKS.--Well WC-226.
PERIOD OF RECORD.--July 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 208.35 ft below land-surface datum, July 17, 1988; lowest measured, 212.32 ft below land-surface datum, October 3, 1983.

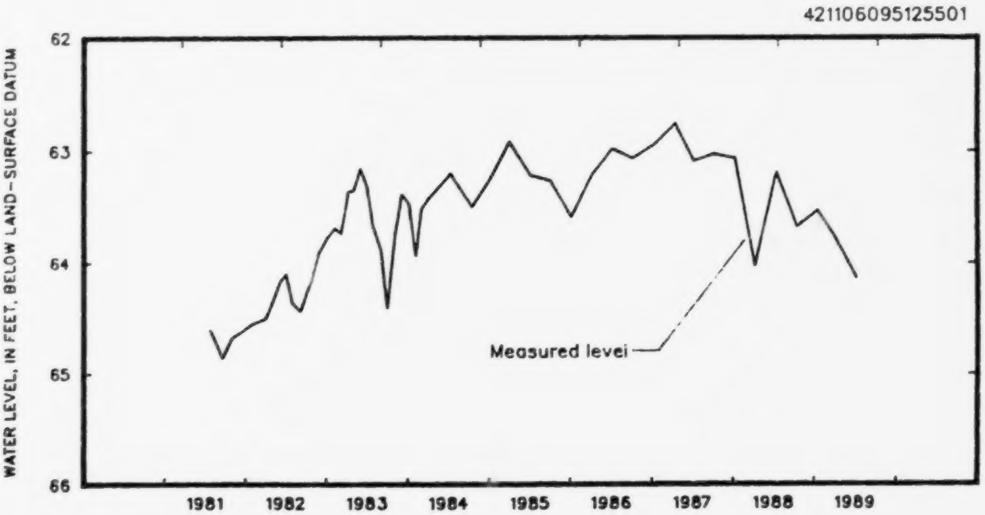
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 01, 1983	211.29	APR 02	211.25	APR 09	210.74	APR 12	208.45
SEP 07	211.56	JUL 12	211.73	JUL 08	210.77	JUL 17	208.35
OCT 03	212.32	OCT 17	211.34	OCT 07	210.63	OCT 18	211.14
NOV 08	211.86	JAN 08, 1985	210.91	JAN 04, 1987	210.65	JAN 17, 1989	208.93
DEC 07	211.09	APR 02	210.58	APR 16	210.45	APR 03	211.75
JAN 09, 1984	209.40	JUL 08	210.73	JUL 09	210.60	JUL 12	211.83
FEB 08	211.20	OCT 07	210.93	OCT 05	210.80		
MAR 05	211.03	JAN 07, 1986	211.18	JAN 13, 1988	210.70		

421106095125501. Local number, 85-38-12 DCBA1.
LOCATION.--Lat 42°11'06", long 95°12'55", Hydrologic Unit 10230007, approximately 5.5 mi east of the Town of Kiron on the south side of County Road E-16 near the Town of Boyer. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 341 ft, cased to 315 ft, slotted from 300-310 ft, gravel-packed open hole from 315-341 ft. Open to Pennsylvanian limestone and shale from 331-341 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,225 ft above National Geodetic Vertical Datum of1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.
REMARKS.--Well WC-14.
PERIOD OF RECORD.--July 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 62.76 ft below land-surface datum, April 16, 1987; lowest measured, 64.86 ft below land-surface datum, September 22, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 28, 1981	64.61	JAN 05, 1983	63.78	FEB 08	63.94	JAN 14, 1988	62.94
SEP 22	64.86	FEB 08	63.69	MAR 05	63.51	APR 16	62.76
NOV 03	64.68	MAR 10	63.74	APR 02	63.43	JUL 09	63.09
FEB 05, 1982	64.55	APR 12	63.36	JUL 12	63.20	OCT 05	63.03
APR 06	64.50	MAY 04	63.35	OCT 17	63.50	JAN 13, 1988	63.07
MAY 06	64.35	JUN 03	63.16	JAN 08, 1985	63.24	APR 12	64.03
JUN 09	64.17	JUL 05	63.33	APR 02	62.92	JUL 17	63.19
JUL 06	64.10	AUG 01	63.68	JUL 08	63.22	OCT 18	63.68
AUG 05	64.37	SEP 07	63.91	OCT 07	63.27	JAN 17, 1989	63.53
SEP 08	64.44	OCT 04	64.41	JAN 07, 1986	63.59	APR 03	63.76
OCT 07	64.26	NOV 08	63.74	APR 09	63.21	JUL 12	64.14
NOV 02	64.14	DEC 07	63.39	JUL 08	62.98		
DEC 02	63.90	JAN 09, 1984	63.48	OCT 07	63.07		



CRAWFORD COUNTY

421031095225601. Local number, 85-39-16 ADDD1.
LOCATION.--Lat 42°10'31", long 95°22'56", Hydrologic Unit 10230007, approximately 2.5 mi east and 0.5 mi north of the Town of Schleswig on the west side of County Road M-27. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 351 ft, cased to 351 ft, slotted from 315-330 ft, gravel-packed. Open to Pennsylvanian rock from 344-351 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.14 ft above land-surface datum.
REMARKS.--Well WC-7A.
PERIOD OF RECORD.--June 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 232.61 ft below land-surface datum, October 7, 1986; lowest measured, 238.35 ft below land-surface datum, June 10, 1981.

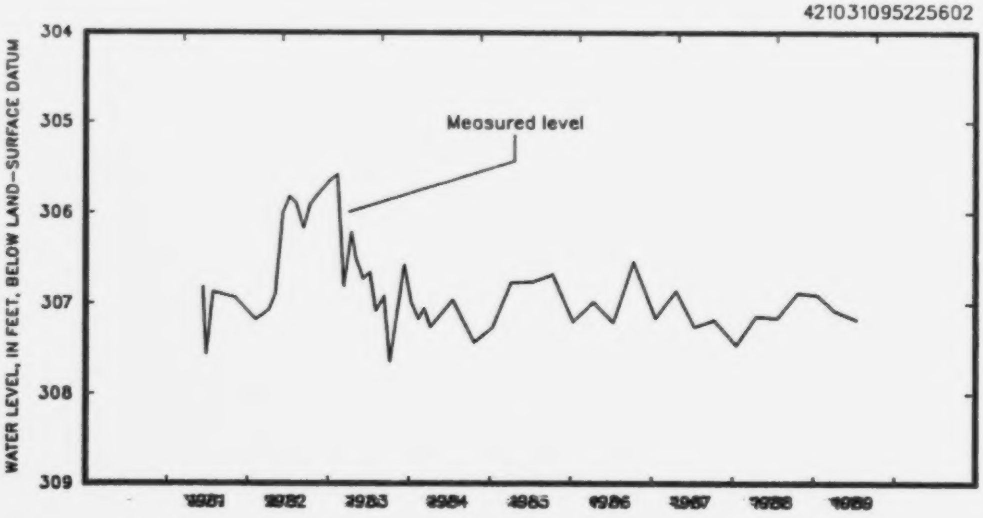
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 10, 1981	238.35						
25	238.26	JAN 03, 1983	234.71	FEB 08	233.64	JAN 14, 1987	232.98
JUL 22	236.60	FEB 08	234.55	MAR 05	233.63	APR 16	233.00
NOV 23	235.43	MAR 10	236.24	APR 02	233.85	JUL 09	233.78
FEB 05, 1982	235.40	APR 12	233.99	JUL 12	233.36	OCT 05	233.64
APR 06	235.34	MAY 04	233.67	OCT 17	233.34	JAN 13, 1988	233.08
MAY 04	235.22	JUN 03	233.83	JAN 08, 1985	233.34	APR 12	232.96
JUN 09	234.40	JUL 05	233.49	APR 02	233.34	JUL 17	234.48
JUL 08	234.05	AUG 01	234.15	JUL 08	233.09	OCT 18	233.08
AUG 05	234.27	SEP 07	234.87	OCT 07	233.16	JAN 17, 1989	233.05
SEP 08	234.34	OCT 04	236.01	JAN 07, 1986	233.25	APR 03	233.54
OCT 07	233.95	NOV 08	234.01	APR 09	233.15	JUL 12	233.71
NOV 01	234.07	DEC 07	233.60	JUL 08	233.04		
DEC 10	234.83	JAN 09, 1984	233.45	OCT 07	232.61		

421031095225602. Local number, 85-39-16 ADDD2.
LOCATION.--Lat 42°10'31", long 95°22'56", Hydrologic Unit 10230007, approximately 2.5 mi east and 0.5 mi north of the Town of Schleswig on the west side of County Road M-27. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Mississippian: in limestone of Mississippian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 561 ft, cased to 561 ft, perforated 543-561 ft, gravel-packed.
METHOD.--Quarterly measurement with electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.14 ft above land-surface datum.
REMARKS.--Well WC-7B.
PERIOD OF RECORD.--June 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 305.58 ft below land-surface datum, February 8, 1983; lowest measured, 307.64 ft below land-surface datum, October 4, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	306.88	JAN 17	306.91	APR 03	307.08	JUL 12	307.18



CRAWFORD COUNTY

421005095342801. Local number, 85-41-13 CCCC1.
LOCATION.--Lat 42°10'05", long 95°34'28", Hydrologic Unit 10230001, approximately 7 mi west of the Town of Schleswig, northeast of the junction of County Roads L-51 and E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota and glacial drift: in sandstone of Cretaceous age and sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 361 ft, cased to 322 ft, slotted from 307-322 ft, gravel-packed. Open to Dakota Formation from 320-361 ft.
METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,375 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.49 ft above land-surface datum.
REMARKS.--Well WC-6.
PERIOD OF RECORD.--May 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 244.23 ft below land-surface datum, July 28, 1981; lowest measured, 249.05 ft below land-surface datum, February 4, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

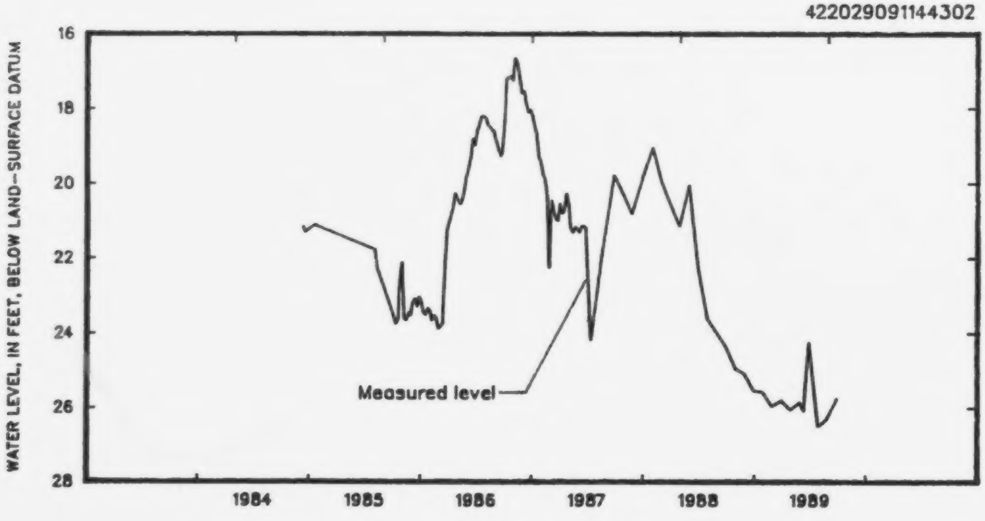
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 19, 1981	247.69	NOV 01	247.26	DEC 06	245.91	OCT 07	245.39
JUN 10	247.79	DEC 10	247.97	JAN 09, 1984	246.00	JAN 14, 1987	245.61
25	245.42	JAN 03, 1983	247.93	FEB 08	245.91	APR 16	245.56
JUL 28	244.23	FEB 08	247.84	MAR 05	245.87	JUL 09	245.97
NOV 03	248.81	MAR 10	247.33	APR 02	246.16	OCT 05	246.06
FEB 05, 1982	249.05	APR 12	246.64	JUL 12	245.11	JAN 13, 1988	246.25
APR 07	248.88	MAY 04	246.50	OCT 17	245.23	APR 12	246.09
MAY 06	248.77	JUN 03	246.30	JAN 08, 1985	245.43	JUL 17	247.03
JUN 09	248.57	JUL 05	246.48	APR 02	245.15	OCT 18	246.86
JUL 06	248.46	AUG 01	246.54	JUL 08	245.47	JAN 17, 1989	246.90
AUG 04	247.68	SEP 08	246.75	OCT 07	245.57	APR 03	247.01
SEP 08	248.67	OCT 04	248.60	JAN 07, 1986	245.83	JUL 12	247.71
OCT 07	247.23	NOV 08	246.34	APR 09	245.49		

DELAWARE COUNTY

422029091144302. Local number, 87-03-18 CBCD2.
LOCATION.--Lat 42°20'37", long 91°14'47", Hydrologic Unit 07060006, behind the municipal utilities building in downtown Hopkinton. Owner: Town of Hopkinton.
AQUIFER.--Silurian: in dolomite of Silurian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 86 ft. Casing information not available.
METHOD.--Monthly measurement with chalked tape by observer.
DATUM.--Elevation of land-surface datum is 863 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.46 ft above land-surface datum.
REMARKS.--Hopkinton #1 well. Water levels affected by pumping of a nearby well.
PERIOD OF RECORD.--December 1984 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.65 ft below land-surface datum, November 6, 1986; lowest measured, 26.49 ft below land-surface datum, July 31, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	24.95	FEB 28	25.95	MAY 31	25.84	JUL 31	26.49
NOV 29	25.09	MAR 31	25.79	JUN 13	26.07	AUG 27	26.29
DEC 30	25.54	APR 30	26.04	JUN 30	26.24	SEP 29	25.74
JAN 29	25.58						



DES MOINES COUNTY

404844091142701. Local number, 69-03-06 AABA1.
LOCATION.--Lat 40°48'44", long 91°14'27", Hydrologic Unit 07080104, at the Iowa Army Ammunition Plant, near the Town of Middleton. Owner: Iowa Ordnance Plant.
AQUIFER.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 16 in., depth 1,209 ft, cased to 855 ft, open hole 855-1,209 ft.
METHOD.--Intermittent measurement with chalked tape by observer.
DATUM.--Elevation of land-surface datum is 717 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of platform, 1.61 ft above land-surface datum.
REMARKS.--Plant well No. 3.
PERIOD OF RECORD.--March 1950 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 105.97 ft below land-surface datum, May 11, 1987; lowest measured, 201.75 ft below land-surface datum, Aug. 15, 1978.

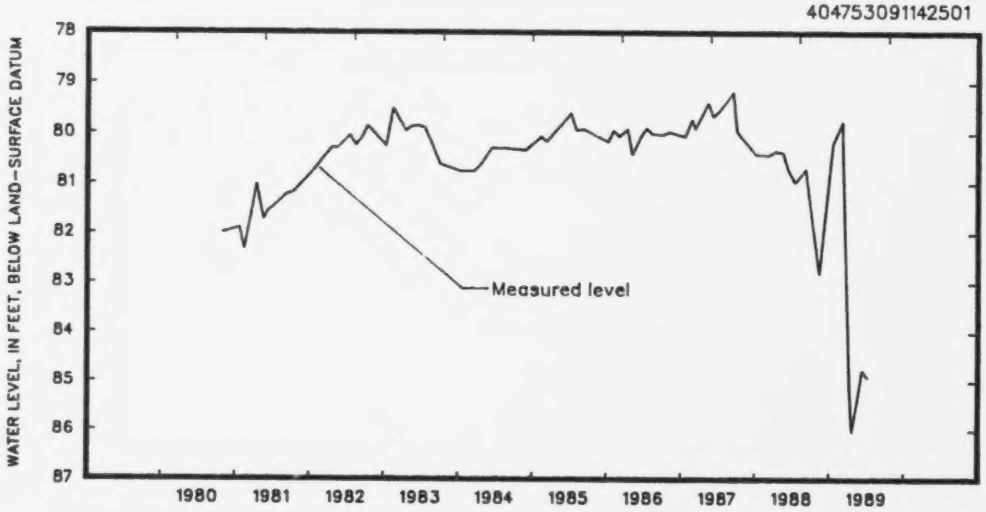
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 12	107.44	MAR 04	106.89	JUN 10	106.39
JAN 18	109.52	APR 09	106.48	JUL 05	106.44

404753091142501. Local number, 69-03-06 DDCD1.
LOCATION.--Lat 40°47'53", long 91°14'25", Hydrologic Unit 07080104, at the Iowa Army Ammunition Plant, near the Town of Middleton. Owner: Iowa Ordnance Plant.
AQUIFER.--Devonian and Mississippian: in Cedar Valley limestone of Devonian age and limestone of Mississippian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 19 in., depth 675 ft, cased to 75 ft, open hole 75-675 ft.
METHOD.--Intermittent measurement with chalked tape by observer.
DATUM.--Elevation of land-surface datum is 699 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of platform, 1.91 ft above land-surface datum.
REMARKS.--Plant well No. 2.
PERIOD OF RECORD.--March 1950 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.46 ft below land-surface datum, April 18, 1975; lowest measured, 86.04 ft below land-surface datum, April 22, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 12	82.84	MAR 04	79.79	APR 22	86.04	JUL 05	84.94
JAN 18	80.19	APR 09	85.17	JUN 10	84.79		



EMMET COUNTY

432927094345501. Local number, 100-32-11 DDDD1.
LOCATION.--Lat 43°29'27", long 94°34'55", Hydrologic Unit 07100003, at Okamanpedan Lake Reserve State Park, north of the Town of Dolliver. Owner: State of Iowa.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled public-supply artesian water well, diameter 6 in., depth 277 ft. Casing information is not available.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,233 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in pump base, 0.61 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--November 1939 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 59.60 ft below land-surface datum, December 19, 1946; lowest measured, 77.86 ft below land-surface datum, August 7, 1979.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

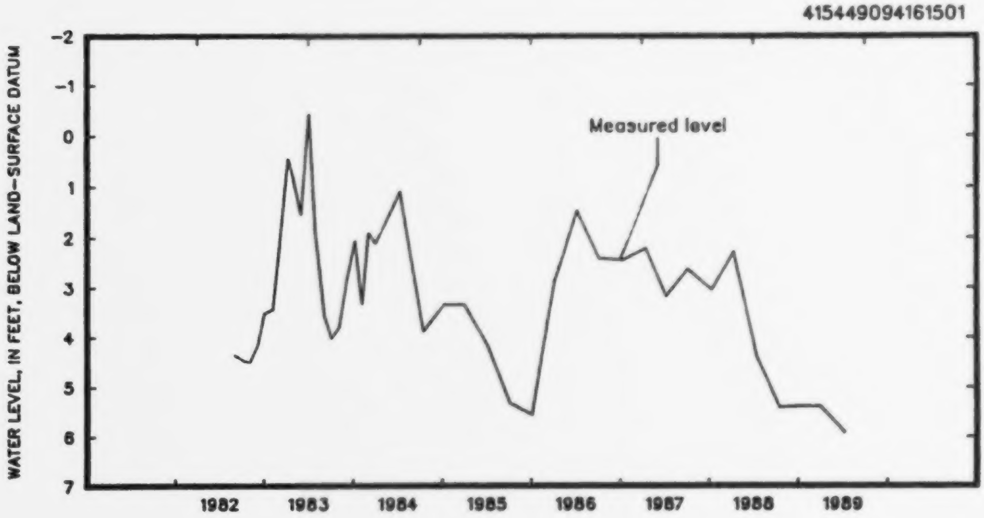
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAR 28	69.17	JUN 07	72.02	AUG 31	69.58

GREENE COUNTY

415449094161501. Local number, 82-29-18 CAAA1.
LOCATION.--Lat 41°54'49", long 94°16'15", Hydrologic Unit 07100006, approximately 0.5 mi south and 4 mi east of the Village of Cooper and just south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 101 ft, cased to 100 ft, perforated 89-100 ft, gravel-packed; open hole 100-101 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 960 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.
REMARKS.--Well W-116.
PERIOD OF RECORD.--September 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.41 ft above land-surface datum, July 12, 1989; lowest measured, 5.93 ft below land-surface datum, July 12, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	5.42	JAN 17	5.39	APR 03	5.39	JUL 12	5.93



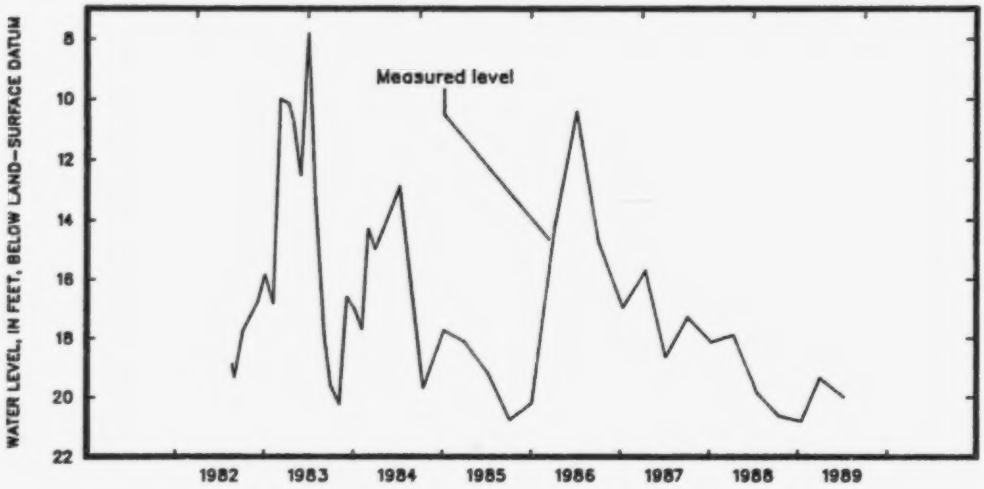
GREENE COUNTY

415448094163401. Local number, 82-29-18 CBAA1.
LOCATION.--Lat 41°54'48", long 94°16'34", Hydrologic Unit 07100006, approximately 3.75 west and 1.5 mi south of the Town of Rippey, south of County Road E-57 on the west edge of the North Raccoon River. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--North Raccoon alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 34 ft, cased to 30 ft, slotted from 20-30 ft, gravel-packed. Open hole from 30-34 ft into glacial till.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 965 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.45 ft above land-surface datum.
REMARKS.--Well WC-115.
PERIOD OF RECORD.--August 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.84 ft below land-surface datum, July 5, 1983; lowest measured, 20.83 ft below land-surface datum, January 17, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 23, 1982	18.88	JUL 05	7.84	OCT 17	19.70	JUL 09	18.65
SEP 02	19.34	AUG 01	13.15	JAN 08, 1985	17.74	OCT 06	17.29
OCT 08	17.73	SEP 08	17.94	APR 02	18.13	JAN 12, 1988	18.15
NOV 05	17.28	OCT 04	19.64	JUL 08	19.19	APR 12	17.90
DEC 09	16.73	NOV 08	20.25	OCT 07	20.78	JUL 18	19.85
JAN 05, 1983	15.86	DEC 08	16.62	JAN 07, 1986	20.19	OCT 18	20.65
FEB 09	16.83	JAN 10, 1984	17.05	APR 09	14.25	JAN 17, 1989	20.83
MAR 11	10.01	FEB 09	17.70	JUL 08	10.42	APR 03	19.36
APR 13	10.17	MAR 05	14.32	OCT 07	14.77	JUL 12	20.02
MAY 04	10.77	APR 02	14.99	JAN 14, 1987	16.98		
JUN 03	12.53	JUL 12	12.89	APR 16	15.70		

415448094163401



415449094155601. Local number, 82-29-18 DBAA.
LOCATION.--Lat 41°54'49", long 94°15'56", Hydrologic Unit 07100006, approximately 3.25 mi west and 1.5 mi south of the Town of Rippey, south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 90 ft, cased to 75 ft, slotted 65-75 ft, gravel-packed; open hole from 75-90 ft. Pleistocene glacial till open from 75-86 ft, and Pennsylvanian shale and siltstone open from 86-90 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,005 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.85 ft above land-surface datum.
REMARKS.--Well WC-117.
PERIOD OF RECORD.--August 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.64 ft below land-surface datum, July 5, 1983; lowest measured, 39.52 ft below land-surface datum, July 12, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

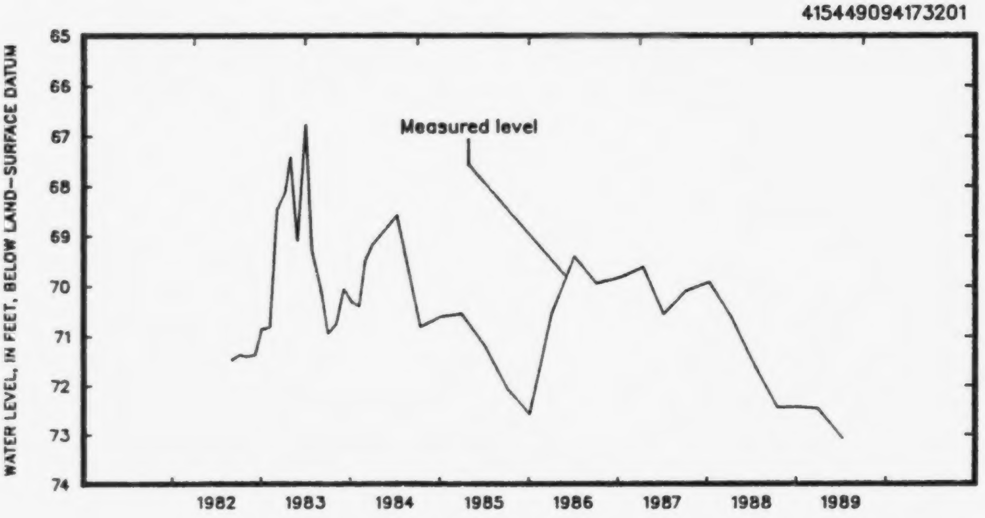
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 25, 1982	37.37	JUL 05	32.64	OCT 17	36.13	JUL 09	35.64
SEP 02	37.23	AUG 01	34.46	JAN 08, 1985	35.48	OCT 06	35.29
OCT 08	37.63	SEP 08	36.16	APR 02	35.47	JAN 12, 1988	35.46
NOV 05	37.72	OCT 05	36.55	JUL 08	36.58	APR 12	35.94
DEC 09	37.63	NOV 08	36.24	OCT 07	37.84	JUL 18	37.37
JAN 05, 1983	36.55	DEC 08	35.16	JAN 07, 1986	37.69	OCT 18	38.46
FEB 09	36.43	JAN 10, 1984	35.70	APR 09	36.27	JAN 17, 1989	38.76
MAR 11	34.89	FEB 09	35.63	JUL 08	36.09	APR 03	38.57
APR 13	33.40	MAR 05	34.33	OCT 07	35.24	JUL 12	39.52
MAY 04	33.61	APR 02	34.48	JAN 14, 1987	34.62		
JUN 03	33.81	JUL 12	35.65	APR 16	34.66		

GREENE COUNTY

415449094173201. Local number, 82-30-13 CABA1.
LOCATION.--Lat 41°54'49", long 94°17'32", Hydrologic Unit 07100306, approximately 0.5 mi south and 3 mi east of the Village of Cooper and just south of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 230 ft, cased to 230 ft, perforated 209-230 ft, gravel-packed. Original depth 245 ft, casing plugged at 230 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,035 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.45 ft above land-surface datum.
REMARKS.--Well WC-118.
PERIOD OF RECORD.--September 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 66.79 ft below land-surface datum, July 5, 1983; lowest measured, 73.09 below land-surface datum, July 12, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER WATER	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	72.46	JAN 17	72.44	APR 03	72.48	JUL 12	73.09



415608094260701. Local number, 82-31-10 AAAA1.
LOCATION.--Lat 41°56'08", long 94°26'07", Hydrologic Unit 07100006, approximately 7 mi south and 3.5 mi west of the City of Jefferson, 1.0 mi east of the junction of County Roads E-57 and P-14 on the south side of County Road E-57. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 125 ft, cased to 125 ft, slotted 111-120, gravel-packed. Open to Pennsylvanian shale and coal 121-125 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,108 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.
REMARKS.--Well WC-235.
PERIOD OF RECORD.--September 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.03 ft below land-surface datum, July 12, 1984; lowest measured, 14.72 ft below land-surface datum, July 12, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

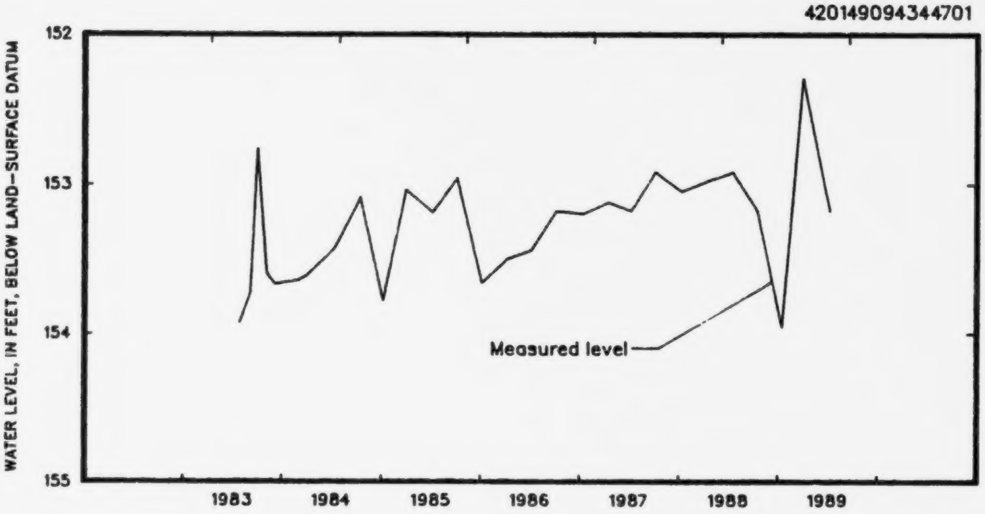
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 08, 1983	14.03	JUL 12	12.03	JUL 08	13.18	JUL 18	13.50
OCT 05	14.17	OCT 17	13.59	OCT 07	13.28	OCT 18	14.43
NOV 08	13.90	JAN 08, 1985	13.48	JAN 14, 1987	12.74	JAN 17, 1989	14.24
DEC 08	13.49	APR 02	13.32	APR 06	12.62	APR 03	14.40
JAN 10, 1984	13.58	JUL 08	13.70	JUL 09	12.84	JUL 12	14.72
FEB 09	13.49	OCT 07	14.25	OCT 06	12.94		
MAR 05	14.43	JAN 07, 1986	14.53	JAN 12, 1988	12.70		
APR 02	13.35	APR 09	14.07	APR 12	13.04		

GREENE COUNTY

420149094344701. Local number, 83-32-04 ACCC1.
LOCATION.--Lat 42°01'49", long 94°34'47", Hydrologic Unit 07100006, 1.5 mi west of the Town of Scranton, south of U.S. Highway 30, adjacent to the Scranton Cemetary. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 240 ft, cased to 240 ft, slotted 220-240 ft, gravel-packed. Open to Pennsylvanian shale 234-240 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,202 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.
REMARKS.--Well WC-228.
PERIOD OF RECORD.--July 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.77 ft below land-surface datum, October 4, 1983; lowest measured, 153.93 ft below land-surface datum, July 29, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 29, 1983	153.93	JUL 12	153.43	APR 09	153.50	JAN 12, 1988	153.05
SEP 08	153.72	OCT 16	153.09	JUL 08	153.44	APR 12	152.98
OCT 04	152.77	JAN 08, 1985	153.78	OCT 07	153.18	JUL 18	152.92
NOV 08	153.60	APR 02	153.04	JAN 14, 1987	153.20	OCT 18	153.18
DEC 07	153.67	JUL 08	153.19	APR 16	153.12	JAN 17, 1989	152.96
MAR 05, 1984	153.64	OCT 07	152.96	JUL 09	153.18	APR 03	152.30
APR 02	153.61	JAN 07, 1986	153.66	OCT 06	152.92	JUL 12	153.18



420116094363001. Local number, 83-32-08 BBBC1.
LOCATION.--Lat 42°01'16", long 94°36'30", Hydrologic Unit 07100006, approximately 3 mi west of the Town of Scranton, south of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Hardin Creek buried channel: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 161-171 ft, gravel-packed. Open to Pennsylvanian shale and siltstone, 171-181 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,135 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.
REMARKS.--Well WC-229.
PERIOD OF RECORD.--September 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 39.64 ft below land-surface datum, July 12, 1984; lowest measured, 51.03 ft below land-surface datum, July 8, 1985.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

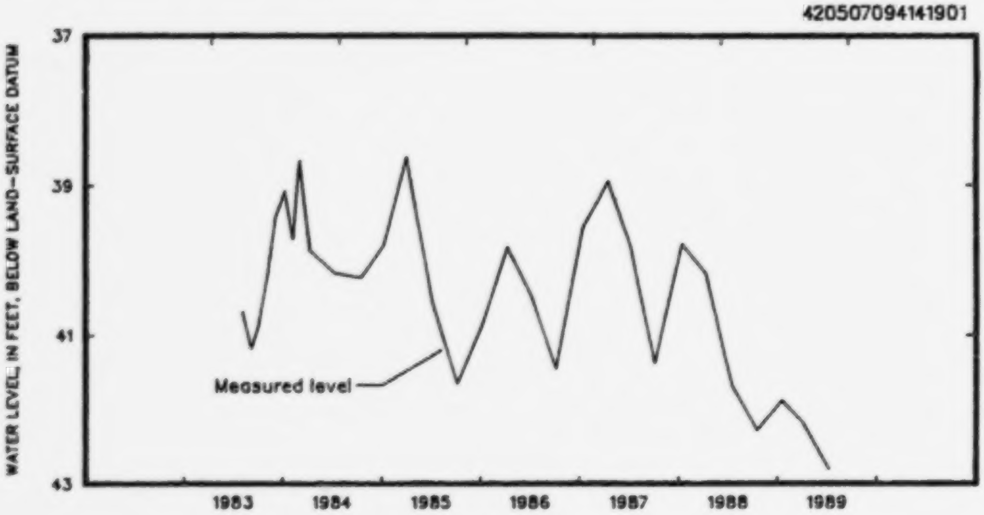
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 07, 1983	46.82	JUL 12	39.64	JUL 08	40.85	JUL 18	41.43
OCT 05	43.46	OCT 16	41.82	OCT 07	40.44	OCT 18	43.39
NOV 08	42.19	JAN 08, 1985	41.01	JAN 14, 1987	40.31	JAN 17, 1989	42.23
DEC 07	41.49	APR 02	40.90	APR 16	40.40	APR 03	42.15
JAN 09, 1984	41.29	JUL 08	51.03	JUL 09	46.06	JUL 12	50.92
FEB 09	41.12	OCT 07	42.78	OCT 06	41.03		
MAR 06	41.10	JAN 07, 1986	42.24	JAN 12, 1988	40.16		
APR 02	40.99	APR 09	42.02	APR 12	40.39		

GREENE COUNTY

420507094141901. Local number, 84-29-16 CBAB1.
LOCATION.--Lat 42°05'07", long 94°14'19", Hydrologic Unit 07100006, approximately 1.5 mi south of the Town of Dana, east of Iowa Highway 144 near the Chicago and Northwestern Railroad. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Beaver buried channel: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 161-176 ft, gravel-packed. Open to Pennsylvanian shale 177-181 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,075 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.80 ft above land-surface datum.
REMARKS.--Well WC-233.
PERIOD OF RECORD.--August 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.63 ft below land-surface datum, April 2, 1985; lowest measured, 42.81 ft below land-surface datum, July 12, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 05, 1983	40.69	APR 12	39.88	APR 09	39.83	APR 12	40.19
SEP 08	41.18	JUL 12	40.18	JUL 08	40.48	JUL 18	41.70
OCT 05	40.86	OCT 16	40.24	OCT 07	41.46	OCT 18	42.29
NOV 08	40.16	JAN 08, 1985	39.80	JAN 14, 1987	39.56	JAN 17, 1989	41.89
DEC 08	39.41	APR 02	38.63	APR 16	38.95	APR 04	42.18
JAN 10, 1984	39.08	JUL 08	40.57	JUL 09	39.84	JUL 12	42.81
FEB 09	39.72	OCT 07	41.66	OCT 06	41.38		
MAR 05	38.68	JAN 07, 1986	40.86	JAN 13, 1988	39.79		



420603094355101. Local number, 84-32-08 ACDB1.
LOCATION.--Lat 42°06'03", long 94°35'51", Hydrologic Unit 07100006, approximately 3.5 mi north and 1.5 mi east of the Town of Ralston near the Raccoon River Bible Camp. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Pennsylvanian and Dakota: in sandstone of Pennsylvanian and Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 2 in., depth 141 ft, cased to 129 ft, slotted 119-129 ft, gravel-packed. Open to Pennsylvanian sandstones from 129-141 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,070 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.55 ft above land-surface datum.
REMARKS.--Well WC-124.
PERIOD OF RECORD.--September 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 33.36 ft below land-surface datum, July 5, 1983; lowest measured, 40.97 ft below land-surface datum, January 7, 1986.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 02, 1982	37.37	AUG 03	35.12	JAN 08, 1985	38.15	OCT 06	37.35
OCT 08	38.47	SEP 08	36.89	APR 02	38.73	JAN 12, 1988	38.33
NOV 05	38.08	OCT 05	37.66	JUL 08	39.10	APR 12	38.65
DEC 09	37.92	NOV 08	37.74	OCT 07	40.30	JUL 18	39.25
JAN 05, 1983	37.62	DEC 07	37.25	JAN 07, 1986	40.97	OCT 18	40.55
FEB 09	38.09	JAN 09, 1984	37.81	APR 09	37.65	JAN 17, 1989	40.59
MAR 11	35.48	FEB 09	37.94	JUL 08	35.81	APR 03	40.38
APR 13	34.58	MAR 05	37.67	OCT 07	36.76	JUL 12	40.67
MAY 04	34.25	APR 02	36.46	JAN 14, 1987	37.00		
JUN 03	34.52	JUL 12	33.72	APR 16	36.90		
JUL 05	33.36	OCT 16	37.72	JUL 09	37.77		

GREENE COUNTY

420723094143201. Local number, 85-29-32 DDDD1.
LOCATION.--Lat 42°07'23", long 94°14'32", Hydrologic Unit 07100006, 1 mi north of the Town of Dana on the west side of Iowa Highway 144. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Beaver buried channel: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 171 ft, cased to 171 ft, slotted 153-168 ft, gravel-packed. Open to Pennsylvanian shale and sandy limestone from 165-171 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,091 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.
REMARKS.--Well WC-232.
PERIOD OF RECORD.--August 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.70 ft below land-surface datum, April 2, 1985; lowest measured, 41.43 ft below land-surface datum, July 12, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 05, 1983	39.36	APR 02	38.76	APR 09	39.54	APR 12	39.16
SEP 08	39.63	JUL 12	38.92	JUL 08	39.49	JUL 18	40.18
OCT 05	39.64	OCT 16	39.34	OCT 07	39.85	OCT 18	40.77
NOV 08	39.40	JAN 08, 1985	39.09	JAN 14, 1987	39.32	JAN 17, 1989	40.62
DEC 08	39.12	APR 02	38.70	APR 16	38.89	APR 04	40.95
JAN 10, 1984	39.05	JUL 08	39.37	JUL 09	39.49	JUL 12	41.43
FEB 09	38.79	OCT 07	39.94	OCT 06	39.84		
MAR 05	38.79	JAN 07, 1986	39.98	JAN 13, 1988	39.52		

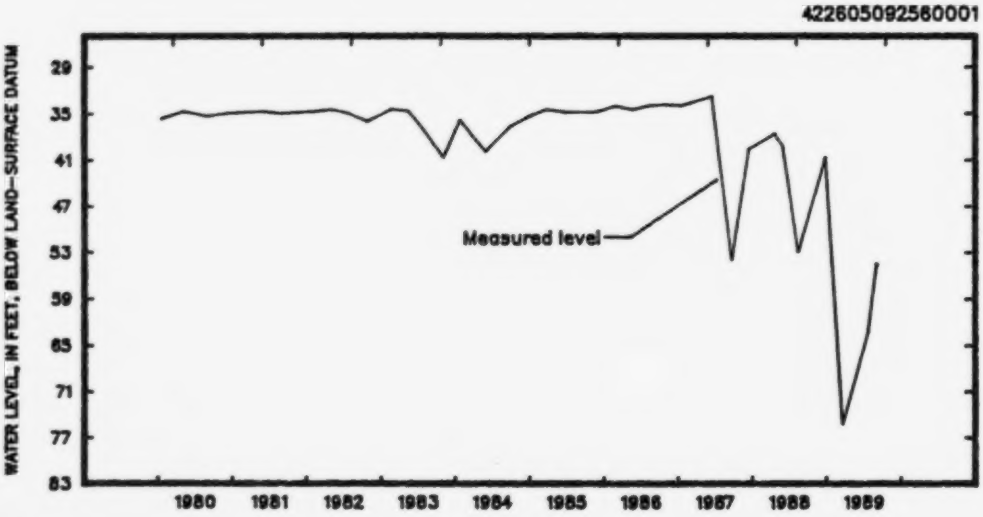
GRUNDY COUNTY

422605092560001. Local number, 88-18-15 DBBB1.
LOCATION.--Lat 42°26'05", long 92°56'00", Hydrologic Unit 07080205, west of the corner of Monroe and 4th Streets and west of the high school, Wellsburg. Owner: City of Wellsburg.
AQUIFER.--Devonian: in limestone and dolomite of Late Devonian age.
WELL CHARACTERISTICS.--Drilled public-emergency-supply artesian water well, diameter 12 in., depth 280 ft, cased to 128 ft, open hole 128-280 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Edge of vent pipe, 1.25 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--September 1960 to August 1971, May 1973 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.78 ft below land-surface datum, June 18, 1987; lowest measured, 96.81 ft below land-surface datum, September 27, 1960.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 29	40.70	JUL 25	63.22	AUG 30	55.94	SEP 06	54.46
MAR 22	p75.24						

p Well recently pumped.

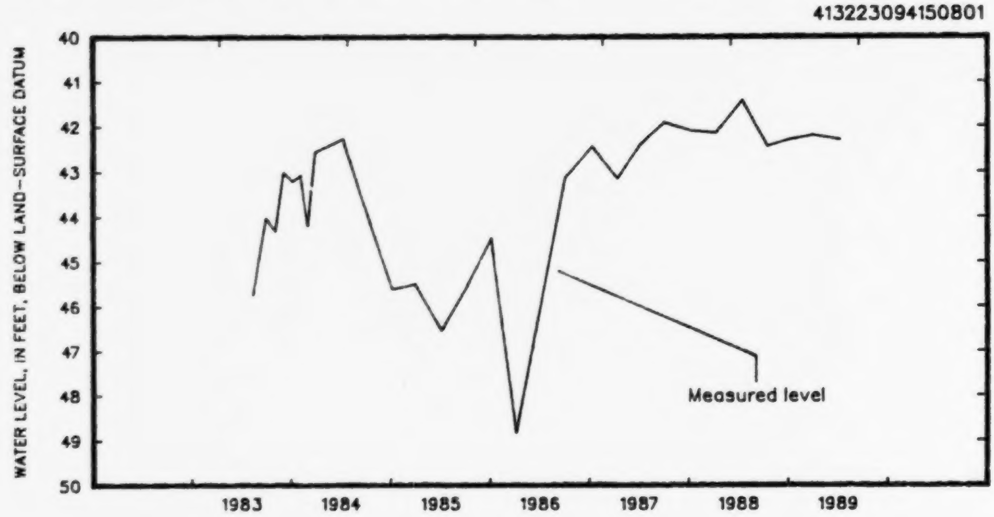


GUTHRIE COUNTY

413223094150801. Local number, 78-30-24 CAAB1
LOCATION.--Lat 41°32'23", long 94°15'08", Hydrologic Unit 07100007, approximately 0.5 mi west and 1.5 north of the Town of Dexter. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drill observation artesian water well, diameter 2 in., depth 72 ft, cased to 72 ft, slotted 60-68 ft, gravel-packed. Open to Pennsylvanian shale 65-72 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,020 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.
REMARKS.--Well WC-238.
PERIOD OF RECORD.--August 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 41.90 ft below land-surface datum, October 6, 1987; lowest measured, 48.82 ft below land-surface datum, April 10, 1986.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVELS	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 15, 1983	45.73	APR 03	42.55	APR 10	48.82	JUL 19	42.41
SEP 06	44.95	JUL 13	42.26	OCT 08	43.11	OCT 19	42.43
OCT 03	44.01	OCT 17	44.07	JAN 15, 1987	42.43	JAN 04, 1989	42.28
NOV 07	44.30	JAN 09, 1985	45.60	APR 17	43.14	APR 04	42.18
DEC 08	43.00	APR 03	45.48	JUL 10	42.39	JUL 13	42.29
JAN 10, 1984	43.20	JUL 09	46.53	OCT 06	41.90		
FEB 09	43.06	OCT 08	45.56	JAN 12, 1988	42.09		
MAR 06	44.18	JAN 08, 1986	44.46	APR 13	42.14		



413248094314301. Local number, 78-32-21 AAAA1.
LOCATION.--Lat 41°32'48", long 94°31'43", Hydrologic Unit 07100008, approximately 2.25 mi north of the Town of Casey. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 161 ft, cased to 135 ft, slotted 125-135 ft, gravel-packed. Open to Pennsylvanian shale 158-161 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,250 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.
REMARKS.--Well WC-239.
PERIOD OF RECORD.--August 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 70.50 ft below land-surface datum, January 12, 1988; lowest measured, 74.38 ft below land-surface datum, January 9, 1985.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 17,1983	73.04	APR 03	72.95	APR 10	73.21	JUL 19	73.12
SEP 06	73.09	JUL 13	73.04	OCT 08	73.14	OCT 19	73.41
OCT 03	73.56	OCT 17	73.22	JAN 15, 1987	73.23	JAN 04, 1989	73.29
NOV 07	72.95	JAN 09, 1985	74.38	APR 17	72.88	APR 04	73.04
DEC 08	73.05	APR 03	73.00	JUL 10	73.00	JUL 13	73.33
JAN 10, 1984	73.64	JUL 09	73.10	OCT 06	73.07		
FEB 09	73.12	OCT 08	73.04	JAN 12, 1988	70.50		
MAR 06	73.22	JAN 08, 1986	73.79	APR 13	73.07		

GUTHRIE COUNTY

413837094194601. Local number, 79-30-22 BAAC1.
LOCATION.--Lat 41°38'37", long 94°19'46", Hydrologic Unit 07100007, approximately 2.5 mi west of the Town of Linden on the west side of County Road F-51. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 152 ft, cased to 150 ft, slotted 140-150 ft, gravel-packed. Open to Pennsylvanian shale 149-152 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,140 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.85 ft above land-surface datum.
REMARKS.--Well WC-109.
PERIOD OF RECORD.--August 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 135.85 ft below land-surface datum, January 15, 1987; lowest measured, 140.75 ft below land-surface datum, August 18, 1982.

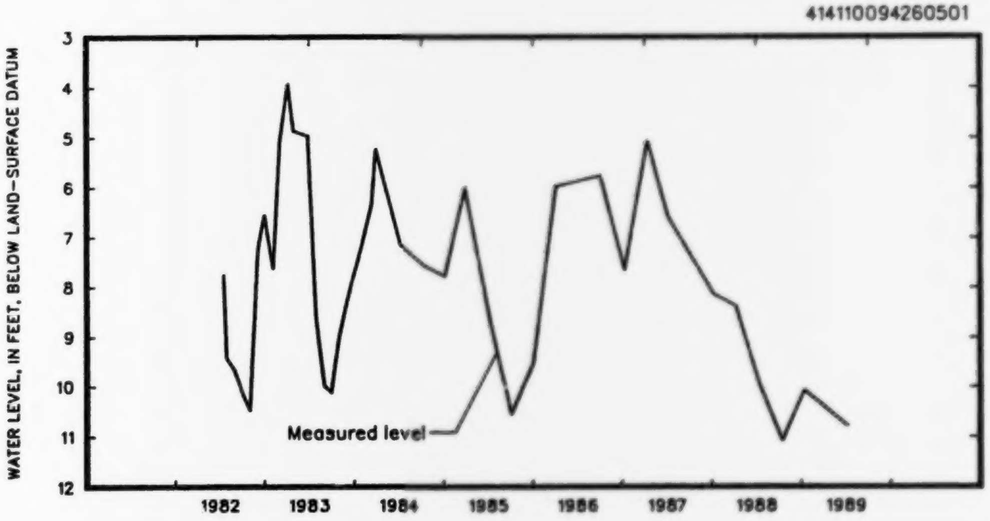
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 18, 1982	140.75	JUL 01	139.77	JUL 12	139.58	JAN 12, 1988	140.10
SEP 02	140.22	AUG 03	139.72	OCT 17	139.89	APR 13	138.87
OCT 08	138.50	SEP 06	139.89	JAN 09, 1985	139.75	JUL 19	139.70
NOV 05	139.85	OCT 03	139.83	APR 03	139.72	OCT 19	140.14
JAN 04, 1983	140.14	NOV 07	139.57	JUL 09	139.68	JAN 18, 1989	139.72
FEB 09	140.08	DEC 08	139.68	OCT 08	139.89	APR 04	140.13
MAR 09	140.25	JAN 10, 1984	140.15	JAN 15, 1987	135.85	JUL 13	140.12
APR 11	140.17	FEB 09	139.57	APR 17	140.05		
MAY 04	140.06	MAR 06	139.83	JUL 10	139.75		
JUN 07	140.17	APR 03	139.53	OCT 08	139.77		

414110094260501. Local number, 79-31-23 BBBB1.
LOCATION.--Lat 41°41'10", long 94°26'05", Hydrologic Unit 07100007, approximately 1 mi north of the Town of Monteith on the east side of County Road P-20. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--South Raccoon alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 27 ft, slotted 21-27 ft, gravel-packed. Open to Pennsylvanian shale 27-30 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,037 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.
REMARKS.--Well WC-85.
PERIOD OF RECORD.--July 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.93 ft below land-surface datum, April 11, 1983; lowest measured, 11.07 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 19, 1982	7.75	JUN 06	4.93	JUL 12	7.15	JUL 10	6.58
AUG 02	9.43	JUL 01	4.97	OCT 17	7.57	OCT 06	7.32
SEP 02	9.66	AUG 03	8.59	JAN 09, 1985	7.78	JAN 12, 1988	8.14
OCT 08	10.17	SEP 06	9.99	APR 03	6.00	APR 13	8.38
NOV 05	10.47	OCT 03	10.12	JUL 09	8.55	JUL 19	9.97
DEC 09	7.22	NOV 07	8.94	OCT 08	10.54	OCT 19	11.07
JAN 04, 1983	6.55	DEC 08	8.26	JAN 08, 1986	9.49	JAN 17, 1989	10.07
FEB 09	7.62	JAN 10, 1984	7.62	APR 10	5.96	APR 04	10.38
MAR 09	5.07	FEB 09	7.07	OCT 08	5.75	JUL 13	10.79
APR 11	3.93	MAR 16	6.34	JAN 15, 1987	7.64		
MAY 04	4.87	APR 03	5.23	APR 17	5.07		

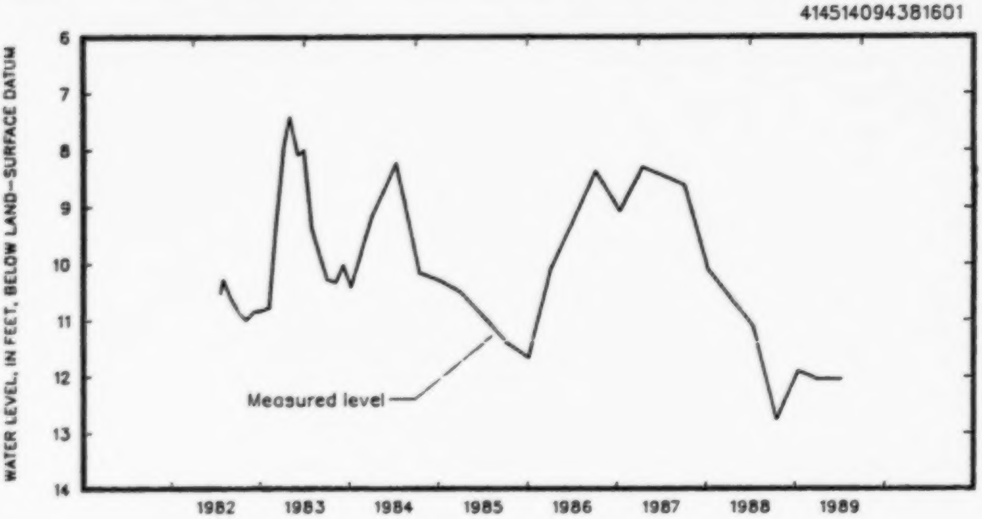


GUTHRIE COUNTY

414514094381601. Local number, 80-33-12 ACCC1.
LOCATION.--Lat 41°45'14", long 94°38'16", Hydrologic Unit 07100007, approximately 6.5 mi west and 4.5 mi north of the Town of Guthrie Center on County Road N-56. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 81 ft, cased to 81 ft, slotted 60-66 ft, gravel-packed.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,170 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.
REMARKS.--Well WC-90.
PERIOD OF RECORD.--July 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.42 ft below land-surface datum, May 4, 1983; lowest measured, 12.75 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 22, 1982	10.51	JUN 07	8.08	JUL 12	8.22	OCT 06	8.61
AUG 02	10.27	JUL 01	8.00	OCT 17	10.16	JAN 12, 1988	10.10
SEP 02	10.60	AUG 03	9.40	JAN 09, 1985	10.30	APR 13	10.60
OCT 06	10.85	SEP 06	9.89	APR 03	10.50	JUL 19	11.13
NOV 05	11.00	OCT 03	10.27	JUL 09	10.95	OCT 19	12.75
DEC 09	10.84	NOV 07	10.33	OCT 08	11.38	JAN 17, 1989	11.89
JAN 04, 1983	10.83	DEC 08	10.02	JAN 08, 1986	11.66	APR 04	12.04
FEB 09	10.77	JAN 10, 1984	10.40	APR 10	10.07	JUL 13	12.04
MAR 09	9.30	FEB 09	9.95	OCT 08	8.36		
APR 11	7.91	MAR 06	9.55	JAN 15, 1987	9.06		
MAY 04	7.42	APR 03	9.16	APR 17	8.29		



414821094271301. Local number, 81-31-22 CCCC1.
LOCATION.--Lat 41°48'21", long 94°27'13", Hydrologic Unit 07100007, approximately 2.5 mi south and 1 mi west of the Town of Bagley, north of Spring Brook State Park. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 153 ft, cased to 153 ft, slotted 143-153 ft, gravel-packed. Open to Pennsylvanian shale 149-153 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,190 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.
REMARKS.--Well WC-105.
PERIOD OF RECORD.--August 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 60.52 ft below land-surface datum, October 6, 1987, and April 13, 1988; lowest measured, 69.88 ft below land-surface datum, December 9, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 12, 1982	68.39	JUL 01	66.37	OCT 17	61.81	JAN 12, 1988	61.12
SEP 02	68.39	AUG 03	65.53	JAN 09, 1985	61.84	APR 13	60.52
OCT 08	66.50	SEP 06	65.06	APR 03	62.05	JUL 19	61.27
NOV 05	68.96	OCT 03	65.11	JUL 09	62.45	OCT 19	62.12
DEC 09	69.88	NOV 07	64.37	OCT 08	63.09	JAN 18, 1989	61.69
JAN 04, 1983	68.21	DEC 08	64.55	JAN 08, 1986	64.04	APR 04	61.03
FEB 09	68.34	JAN 10, 1984	64.94	APR 10	64.34	JUL 13	64.01
MAR 09	68.12	FEB 09	64.39	OCT 08	63.08		
APR 11	68.10	MAR 05	64.61	JAN 15, 1987	62.35		
MAY 04	68.69	APR 03	64.92	APR 17	61.49		
JUN 07	68.51	JUL 12	62.52	OCT 06	60.52		

GUTHRIE COUNTY

414652094293301. Local number, 81-31-32 CBCC1.

LOCATION.--Lat 41°46'52", long 94°29'33", Hydrologic Unit 07100007, approximately 1 mi west of Springbrook State Park at the junction of Iowa Highways 25 and 384. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Middle Raccoon alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 52 ft, cased to 51 ft, slotted 40-51 ft, gravel-packed, open hole 51-52 ft. Open to Pennsylvanian shale, 49-52 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.03 ft above land-surface datum.

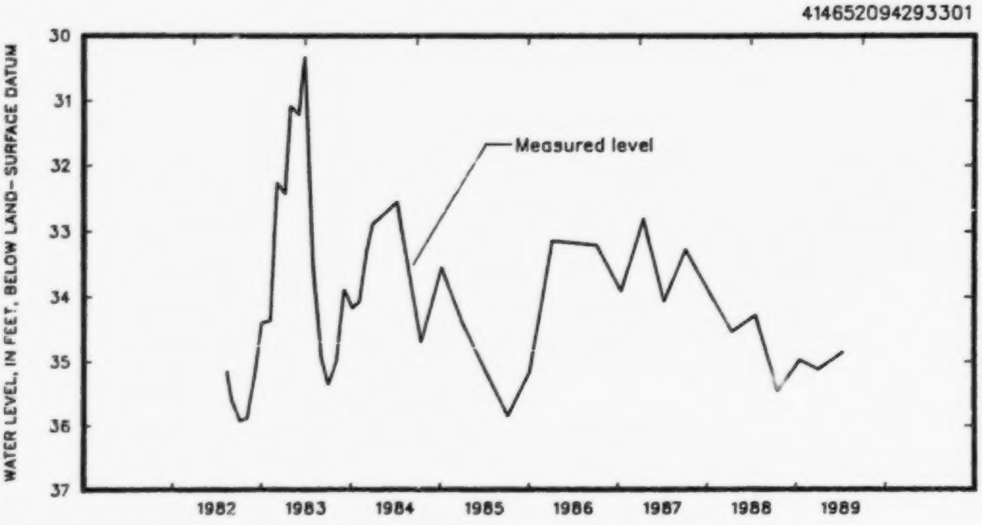
REMARKS.--Well WC-106.

PERIOD OF RECORD.--August 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.33 ft below land-surface datum, July 1, 1983; lowest measured, 35.92 ft below land-surface datum, October 6, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 13, 1982	35.15	JUL 01	30.33	OCT 17	34.69	OCT 06	33.27
SEP 02	35.59	AUG 03	33.49	JAN 09, 1985	33.55	JAN 12, 1988	33.93
OCT 06	35.92	SEP 06	34.94	APR 03	34.39	APR 13	34.54
NOV 05	35.87	OCT 03	35.35	JUL 09	35.14	JUL 19	34.28
DEC 09	35.13	NOV 07	34.96	OCT 08	35.84	OCT 19	35.45
JAN 04, 1983	34.40	DEC 08	33.89	JAN 08, 1986	35.13	JAN 18, 1989	34.97
FEB 09	34.36	JAN 10, 1984	34.17	APR 10	33.14	APR 04	35.12
MAR 09	32.26	FEB 09	34.06	OCT 08	33.21	JUL 13	34.85
APR 11	32.42	MAR 06	33.30	JAN 15, 1987	33.91		
MAY 04	31.08	APR 03	32.88	APR 17	32.80		
JUN 07	31.21	JUL 12	32.55	JUL 10	34.06		



414728094385301. Local number, 81-33-26 DDDD1.

LOCATION.--Lat 41°47'28", long 94°38'53", Hydrologic Unit 07100007, approximately 5 mi south and 1.25 mi east of the Town of Coon Rapids on the north side of County Road F-24. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 80 ft, cased to 75 ft, slotted 60-65 ft, gravel-packed, open hole 75-80 ft. Open to Pennsylvanian shale 67-80 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,205 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.

REMARKS.--Well WC-93.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.52 ft below land-surface datum, June 7, 1983; lowest measured, 40.98 ft below land-surface datum, January 3, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 27, 1982	40.70	JUN 07	38.52	JUL 13	38.58	OCT 06	39.02
AUG 02	40.72	JUL 01	39.23	OCT 17	39.57	JAN 12, 1988	39.85
SEP 02	40.82	AUG 03	39.29	JAN 09, 1985	39.88	APR 13	39.76
OCT 06	40.91	SEP 06	39.37	APR 03	40.04	JUL 19	40.08
NOV 05	40.93	OCT 03	39.63	JUL 09	40.18	OCT 19	40.27
DEC 09	40.97	NOV 07	39.84	OCT 08	40.42	JAN 17, 1989	40.33
JAN 03, 1983	40.98	DEC 08	39.00	JAN 08, 1986	40.52	APR 04	40.53
FEB 09	40.89	JAN 10, 1984	40.12	APR 10	40.51	JUL 13	40.59
MAR 09	40.69	FEB 09	40.18	OCT 08	39.08		
APR 11	40.33	MAR 06	39.93	JAN 15, 1987	39.47		
MAY 04	39.92	APR 03	39.83	APR 17	39.74		

GUTHRIE COUNTY

414728094392401. Local number, 81-33-35 ABBC1.

LOCATION.--Lat 41°47'28", long 94°39'24", Hydrologic Unit 07100007, approximately 5 mi south and 1 mi east of the Town of Coon Rapids, on the south side of County Road F-24. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--South Raccoon alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 41 ft, cased to 35 ft, slotted 26-35 ft gravel-packed, open hole 35-41 ft. Open to Early Cretaceous sandstone and shale 38-41 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,150 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.80 ft above land-surface datum.

REMARKS.--Well WC-94.

PERIOD OF RECORD.--July 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.80 ft below land-surface datum, July 1, 1983; lowest measured, 16.65 ft below land-surface datum, April 4, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 27, 1982	15.13	JUN 07	13.92	JUL 13	13.16	OCT 16	14.74
AUG 01	15.21	JUL 01	12.80	OCT 17	14.66	JAN 12, 1988	14.81
SEP 02	15.41	AUG 03	14.22	JAN 09, 1985	14.86	APR 13	15.55
OCT 06	15.66	SEP 06	14.42	APR 03	15.08	JUL 19	15.58
NOV 05	15.72	OCT 03	14.92	JUL 09	15.19	OCT 19	16.28
DEC 09	15.35	NOV 07	14.99	OCT 08	15.81	JAN 17, 1989	16.33
JAN 04, 1983	14.95	DEC 08	14.75	JAN 08, 1986	15.79	APR 04	16.65
FEB 09	14.83	JAN 10, 1984	14.83	APR 10	15.08	JUL 13	16.54
MAR 09	14.21	FEB 09	14.78	OCT 08	14.82		
APR 11	13.31	MAR 06	14.70	JAN 15, 1987	15.14		
MAY 04	13.16	APR 03	14.16	APR 17	14.16		

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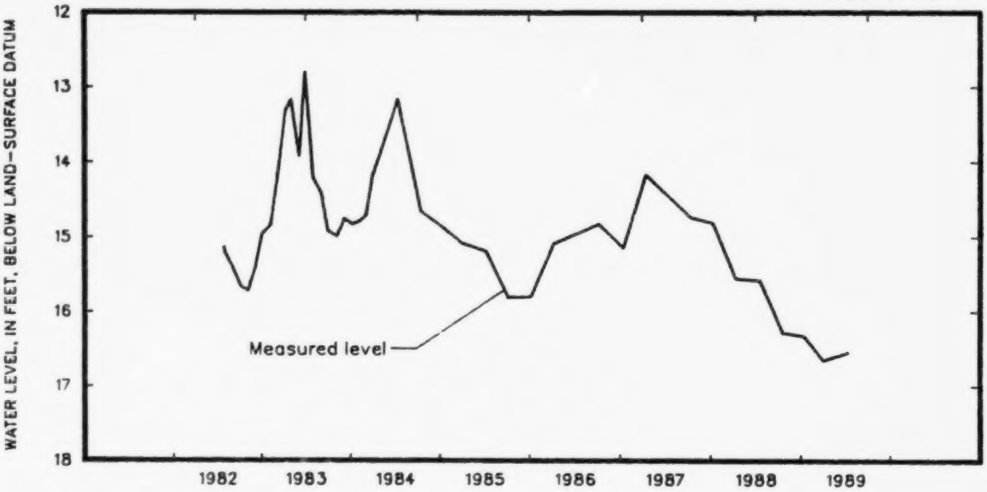


HARRISON COUNTY

413024095353901. Local number, 78-41-31 DDDD1.

LOCATION.--Lat 41°30'24", long 95°35'39", Hydrologic Unit 10230006, approximately 4.5 mi south of the Town of Persia and west of Iowa Highway 191 to the north of the Tri-County High School. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 129 ft, cased to 129 ft, slotted 109-119 ft, gravel-packed. Open to Pennsylvanian shale and limestone 118-129 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,158 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.05 ft above land-surface datum.

REMARKS.--Well WC-27.

PERIOD OF RECORD.--January 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 55.26 ft below land-surface datum, July 7, 1982; lowest measured, 60.54 ft below land-surface datum, July 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 13, 1982	57.49	MAR 10	57.48	MAR 06	57.82	JAN 14, 1987	56.45
APR 06	56.84	APR 12	56.97	APR 11	57.31	APR 15	56.51
MAY 06	56.70	MAY 02	56.33	JUL 10	56.32	JUL 09	56.44
JUN 03	55.94	JUN 01	56.33	OCT 17	56.83	OCT 09	56.77
JUL 07	55.26	JUL 06	56.35	JAN 09, 1985	57.04	JAN 14, 1988	57.08
AUG 03	55.41	AUG 02	56.76	APR 02	56.93	APR 12	57.49
SEP 09	55.49	SEP 07	56.93	JUL 11	57.40	JUL 20	58.35
OCT 07	55.39	OCT 03	57.38	OCT 09	57.77	OCT 19	58.92
NOV 01	55.33	NOV 08	57.41	JAN 08, 1986	58.22	JAN 20, 1989	59.30
DEC 02	57.59	DEC 13	57.50	APR 09	57.97	APR 05	59.53
JAN 04, 1983	57.75	JAN 12, 1984	57.87	JUL 09	57.02	JUL 05	60.54
		FEB 08	57.73	FEB 09	58.03	OCT 08	57.03

HARRISON COUNTY

413523095483101. Local number, 78-45-05 ACDD1.

LOCATION.--Lat 41°35'23", long 95°48'31", Hydrologic Unit 10230007, approximately 3.25 mis south of the Town of Logan and 1.5 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 179 ft, cased to 179 ft, slotted 168-175 ft, gravel-packed. Open to Pennsylvanian shale 175-179 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,080 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.35 ft above land-surface datum.

REMARKS.--Well WC-33.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 70.32 ft below land-surface datum, August 22, 1984; lowest measured, 74.90 ft below land-surface datum, February 16, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 13, 1982	73.76	NOV 08	73.50	OCT 16	70.45	NOV 27	72.49
JUN 03	72.79	DEC 13	73.30	NOV 26	73.69	JAN 14, 1988	73.03
JUL 07	72.94	JAN 12, 1984	73.54	JAN 09, 1986	73.80	FEB 16	74.90
AUG 03	73.64	FEB 08	73.59	FEB 21	73.72	MAR 30	72.54
SEP 09	74.19	MAR 06	72.34	MAR 19	72.65	MAY 06	72.80
OCT 07	73.70	APR 11	71.71	MAY 01	72.02	MAY 20	73.43
NOV 01	73.17	MAY 30	71.24	JUN 13	71.88	AUG 01	73.81
DEC 02	72.82	JUL 11	71.44	JUL 22	72.46	SEP 09	74.51
JAN 03, 1983	73.00	AUG 22	70.32	SEP 05	73.21	OCT 17	74.39
FEB 08	73.14	OCT 02	73.51	OCT 14	71.17	DEC 02	74.13
MAR 10	72.02	NOV 14	73.16	NOV 19	71.20	JAN 17, 1989	74.02
APR 12	71.04	DEC 27	72.62	JAN 02, 1987	71.65	FEB 16	74.08
MAY 02	71.38	FEB 04, 1985	73.14	FEB 25	72.13	APR 06	73.90
JUN 01	71.95	MAR 20	72.80	MAR 18	71.89	MAY 18	74.05
JUL 06	71.79	MAY 01	72.50	APR 28	71.29	JUN 29	73.73
AUG 02	72.87	JUN 11	72.87	JUN 22	71.94	AUG 09	74.20
SEP 07	73.72	JUL 24	73.25	JUL 27	72.33	SEP 21	73.62
OCT 04	73.91	SEP 03	73.97	OCT 16	72.55		

413524095490601. Local number, 78-43-05 BCDD1.

LOCATION.--Lat 41°35'24", long 95°49'06", Hydrologic Unit 10230007, approximately 2 mi north and 3.5 mi east of the Town of Missouri Valley and 1 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 51 ft, cased to 51 ft, slotted 48-51 ft, gravel-packed.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,010 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.10 ft above land-surface datum.

REMARKS.--Well WC-32.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.71 ft below land-surface datum, April 12, 1983; lowest measured, 7.00 ft below land-surface datum, September 9, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 13, 1982	4.71	NOV 08	5.32	OCT 16	5.80	NOV 27	4.65
JUN 03	4.18	DEC 13	5.20	NOV 26	5.70	JAN 04, 1988	4.70
JUL 07	4.31	JAN 12, 1984	5.45	JAN 09, 1986	5.88	FEB 16	5.35
AUG 03	5.66	FEB 08	5.40	FEB 21	5.68	MAR 30	4.77
SEP 09	5.99	MAR 06	4.12	MAR 19	3.86	MAY 06	5.13
OCT 07	5.19	APR 11	3.44	MAY 01	3.67	JUN 20	5.73
NOV 01	4.81	MAY 30	3.54	JUN 13	3.79	AUG 01	6.25
DEC 02	4.38	JUL 11	4.17	JUL 22	4.89	SEP 09	7.00
JAN 03, 1983	4.74	AUG 21	5.48	SEP 05	5.46	OCT 17	6.65
FEB 08	4.89	OCT 02	5.91	OCT 14	3.15	DEC 02	6.28
MAR 10	3.65	NOV 14	5.42	NOV 19	3.65	JAN 17, 1989	6.12
APR 12	2.71	DEC 27	4.69	JAN 02, 1987	4.22	FEB 16	6.14
MAY 02	3.26	FEB 04, 1985	5.48	FEB 25	4.32	APR 06	5.88
JUN 01	4.29	MAR 20	4.58	MAR 18	3.86	MAY 18	5.95
JUL 06	4.13	MAY 01	4.24	APR 28	4.08	JUN 29	5.90
AUG 02	5.16	JUN 11	4.92	MAY 12	4.27	AUG 09	6.54
SEP 07	6.09	JUL 24	5.80	JUN 22	4.66		
OCT 04	6.44	SEP 03	6.29	JUL 27	5.01		

HARRISON COUNTY

413838095462001. Local number, 79-42-19 AADB1.
LOCATION.--Lat 41°38'38", long 95°46'20", Hydrologic Unit 10230007, approximately 0.5 mi east of the Town of Logan, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Mississippian: in dolomite of Mississippian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 628 ft, cased to 628 ft, perforated 588-628 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,045 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.40 ft above land-surface datum.
REMARKS.--Well WC-22.
PERIOD OF RECORD.--November 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.33 ft above land-surface datum, June 9, 1987; lowest measured, 16.37 ft below land-surface datum, June 3, 1982.

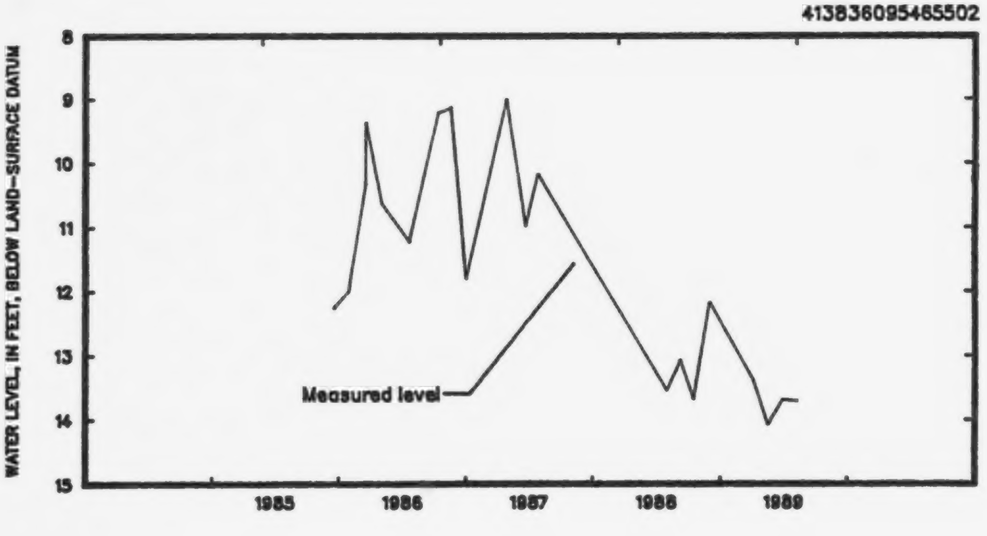
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	1.50	JAN 17,1989	1.39	MAY 18	1.70	AUG 09	2.40
DEC 02	1.77	APR 06	1.74	JUN 29	2.30	SEP 21	2.45

413836095465502. Local number, 79-42-19 BADC2.
LOCATION.--Lat 41°38'36", long 95°46'55", Hydrologic Unit 10230007, approximately 0.25 mi east of the Town of Logan, north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 5 in., depth 49 ft, cased to 49 ft, slotted 31-49 ft, gravel-packed.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,030 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.40 ft above land-surface datum.
REMARKS.--Well WC-196.
PERIOD OF RECORD.--June 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.36 ft below land-surface datum, May 30, 1984; lowest measured, 14.08 ft below land-surface datum, May 18, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 03, 1983	12.12	MAY 30	8.36	JAN 30, 1986	12.00	SEP 09	13.08
JUL 06	9.53	JUL 12	11.59	MAR 19	10.34	OCT 17	13.68
AUG 02	11.48	AUG 21	11.49	MAR 20	9.38	DEC 02	12.18
AUG 16	13.08	OCT 02	12.03	MAY 05	10.65	APR 06, 1989	13.34
SEP 07	13.42	JAN 02, 1985	10.97	JUL 22	11.23	MAY 18	14.08
OCT 04	13.17	MAR 21	12.80	OCT 14	9.22	JUN 29	13.69
NOV 08	12.72	APR 29	12.86	NOV 19	9.14	AUG 09	13.72
DEC 16	11.79	JUN 12	12.08	JAN 02, 1987	11.81		
JAN 12, 1984	11.98	JUL 24	10.21	APR 28	9.01		
FEB 07	12.67	OCT 01	11.78	JUN 22	10.98		
MAR 06	11.09	NOV 13	12.29	JUL 27	10.18		
APR 11	10.36	DEC 17	12.27	AUG 01, 1988	13.55		



HARRISON COUNTY

414226095435002. Local number, 80-42-27 CCBA2.

LOCATION.--Lat 41°42'26", long 95°43'50", Hydrologic Unit 10230007, approximately 2 mi south and 1.5 mi west of the Town of Woodbine, west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 41 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed, open hole 40-41 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,050 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.80 ft above land-surface datum.

REMARKS.--Well WC-192.

PERIOD OF RECORD.--June 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.26 ft below land-surface datum, June 13, 1986; lowest measured, 14.27 ft below land-surface datum, August 9, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 01, 1983	9.57	NOV 14	12.04	JUL 22	10.49	FEB 16	12.05
JUL 06	9.61	DEC 27	10.99	SEP 05	11.37	MAR 30	12.35
AUG 02	11.21	FEB 04, 1985	11.40	OCT 14	8.57	MAY 06	12.48
SEP 07	12.61	MAR 20	11.78	NOV 19	9.84	JUN 20	12.82
OCT 04	12.86	MAY 01	10.94	JAN 02, 1987	11.32	AUG 01	13.35
NOV 08	12.62	JUN 11	10.11	FEB 25	11.80	SEP 09	14.10
DEC 13	12.26	JUL 24	12.04	MAR 18	11.67	OCT 17	14.15
JAN 11, 1984	12.20	SEP 03	12.71	APR 28	9.77	DEC 02	14.00
FEB 07	12.10	OCT 16	12.80	MAY 12	10.41	JAN 17, 1989	13.77
MAR 06	11.04	NOV 25	12.61	MAY 12	10.50	FEB 16	13.79
APR 11	9.99	JAN 09, 1986	12.57	JUN 19	10.55	APR 06	13.80
MAY 30	8.55	JAN 21	12.53	JUL 27	10.88	MAY 18	13.97
JUL 11	9.64	MAR 19	9.94	OCT 16	11.45	JUN 29	13.72
AUG 21	11.60	MAY 01	9.28	NOV 27	12.05	AUG 09	14.27
OCT 03	12.52	JUN 13	8.26	JAN 14, 1988	12.04		

414228095442301. Local number, 80-42-28 DBCD1.

LOCATION.--Lat 41°42'28", long 95°44'23", Hydrologic Unit 10230007, approximately 2 mi south and 1.75 mi west of the Town of Woodbine, west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 53 ft, cased to 52 ft, slotted 46-52 ft, gravel-packed, open hole 52-53 ft. Open to Pennsylvanian shale 51-53 ft.

METHOD.--Intermittent measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.

REMARKS.--Well WC-37.

PERIOD OF RECORD.--May 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.75 ft below land-surface datum, April 12, 1983; lowest measured, 22.43 ft below land-surface datum, August 9, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 18, 1982	20.62	DEC 13	18.55	NOV 25	19.54	NOV 27	18.02
JUN 03	18.50	JAN 11, 1984	18.66	JAN 09, 1986	19.71	JAN 14, 1988	18.30
JUL 07	18.78	FEB 07	18.50	FEB 21	19.78	FEB 16	18.43
AUG 03	20.04	MAR 06	16.84	MAR 19	17.72	MAR 30	18.95
OCT 07	18.93	APR 11	15.94	MAY 01	16.60	MAY 30	19.15
NOV 01	18.83	MAY 30	14.10	JUN 13	16.57	JUN 20	19.77
DEC 02	18.35	JUL 11	14.90	JUL 22	16.40	AUG 01	20.43
JAN 03, 1983	18.24	AUG 21	16.85	SEP 05	17.14	SEP 09	21.35
FEB 08	18.47	OCT 03	18.15	OCT 14	14.82	OCT 17	21.35
MAR 10	15.39	NOV 14	17.77	NOV 19	15.25	DEC 02	21.73
APR 12	13.75	DEC 27	16.66	JAN 02, 1987	16.61	JAN 17, 1989	21.70
MAY 02	14.07	FEB 04, 1985	17.39	FEB 25	17.50	FEB 16	21.77
JUN 01	15.12	MAR 20	17.34	MAR 18	17.47	APR 16	21.80
JUL 06	16.39	MAY 01	17.35	APR 28	15.09	MAY 18	22.08
AUG 02	16.78	JUN 11	17.47	MAY 12	15.64	JUN 29	21.78
SEP 07	17.49	JUL 24	18.43	JUN 19	15.86	AUG 09	22.43
OCT 04	18.69	SEP 03	19.29	JUL 27	16.14		
NOV 08	18.70	OCT 16	19.50	OCT 16	17.46		

HARRISON COUNTY

414213095431602. Local number, 80-42-34 ABBB2.
LOCATION.--Lat 41°42'13", long 95°43'16", Hydrologic Unit 10230007, approximately 2 mi south of the Town of Woodbine and 1 mi west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 37 ft, cased to 37 ft, slotted 32-37 ft, gravel-packed.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,045 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.30 ft above land-surface datum.
REMARKS.--Well WC-191.
PERIOD OF RECORD.--May 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.08 ft below land-surface datum, October 14, 1986; lowest measured, 7.20 ft below land-surface datum, September 9, 1988.

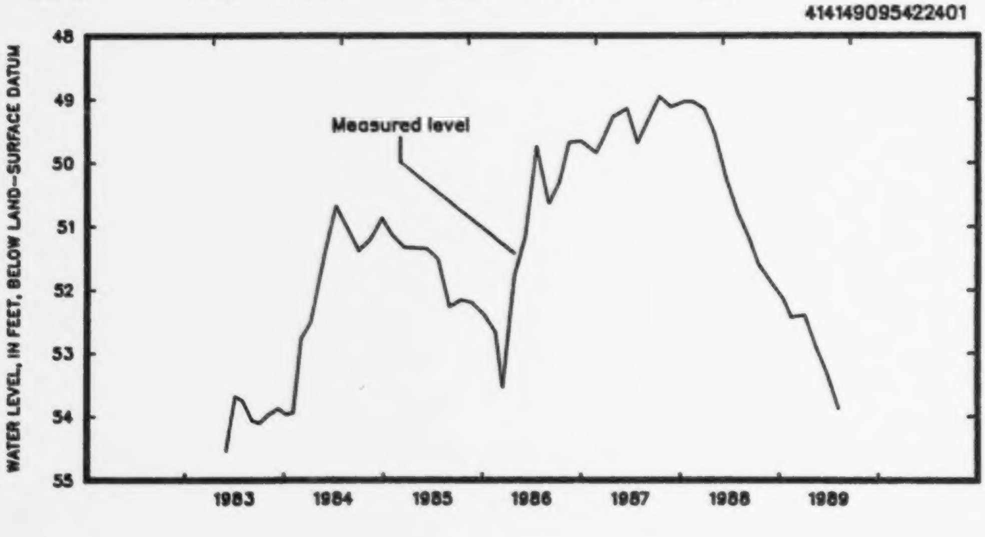
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 27, 1983	5.35	OCT 03	6.19	JUN 13	5.07	FEB 16	6.09
JUN 01	5.40	NOV 14	5.45	JUL 22	5.53	MAR 30	5.67
JUL 06	5.71	DEC 27	5.23	SEP 05	5.36	MAY 06	6.10
AUG 02	6.09	FEB 04, 1985	6.09	OCT 14	4.08	JUN 20	6.62
SEP 07	6.85	MAR 20	5.25	NOV 19	4.48	AUG 01	6.85
OCT 04	6.34	MAY 01	4.74	JAN 02, 1987	5.15	SEP 09	7.20
NOV 08	5.79	JUN 11	5.73	FEB 25	5.07	OCT 17	6.70
DEC 13	5.86	JUL 24	6.25	MAR 18	4.26	DEC 02	6.30
JAN 11, 1984	4.94	SEP 03	6.48	APR 28	5.30	JAN 17, 1989	6.37
FEB 07	5.85	OCT 16	5.78	MAY 12	5.26	FEB 16	6.42
MAR 06	5.07	NOV 25	5.82	JUN 19	5.98	APR 06	6.17
APR 11	4.73	JAN 09, 1986	6.15	JUL 27	5.89	MAY 18	6.59
MAY 30	5.00	FEB 21	5.84	OCT 16	5.49	JUN 29	6.30
JUL 11	5.74	MAR 19	4.15	NOV 27	5.75	AUG 09	7.01
AUG 21	6.43	MAY 01	4.35	JAN 14, 1988	6.15		

414149095422401. Local number, 80-42-35 BDCC1.
LOCATION.--Lat 41°41'49", long 95°42'24", Hydrologic Unit 10230007, approximately 3 mi south of the Town of Woodbine, on the west side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 120 ft, cased to 118 ft, slotted 103-105 ft, gravel-packed, open hole 118-120 ft. Open to Pennsylvanian shale 112-120 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,140 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.70 ft above land-surface datum.
REMARKS.--Well WC-193.
PERIOD OF RECORD.--June 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 48.96 ft below land-surface datum, October 16, 1987; lowest measured, 54.55 ft below land-surface datum, June 1, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 01, 1983	54.55	NOV 14	51.21	JUL 22	49.75	MAY 06	49.53
JUL 06	53.69	DEC 27	50.88	SEP 05	50.64	JUN 20	50.26
AUG 02	53.76	FEB 04, 1985	51.15	OCT 14	50.30	AUG 01	50.79
SEP 07	54.07	MAR 20	51.34	NOV 19	49.68	SEPT 09	51.16
OCT 04	54.11	MAY 01	51.35	JAN 02, 1987	49.66	OCT 17	51.60
NOV 08	53.97	JUN 11	51.36	FEB 25	49.85	DEC 02	51.88
DEC 13	53.88	JUL 24	51.53	MAR 18	49.67	JAN 17, 1989	52.15
JAN 11, 1984	53.98	SEP 03	52.27	APR 28	49.28	FEB 16	52.44
FEB 07	53.94	OCT 16	52.16	JUN 19	49.15	APR 06	52.40
MAR 06	52.77	NOV 25	52.21	JUL 27	49.69	MAY 18	52.90
APR 11	52.50	JAN 09, 1986	52.40	OCT 16	48.96	JUN 29	53.34
MAY 30	51.46	FEB 21	52.68	NOV 27	49.13	AUG 09	53.88
JUL 11	50.69	MAR 19	53.54	JAN 14, 1988	49.04	SEP 21	53.67
AUG 21	51.03	MAY 01	51.76	FEB 16	49.04		
OCT 03	51.39	JUN 10	51.15	MAR 30	49.16		



415124095361501. Local number, 81-41-03 ACCC1.
LOCATION.--Lat 41°51'24", long 95°36'15", Hydrologic Unit 10230007, in the northwest part of the Town of Dunlap, south of Iowa Highway 37 and west of U.S. Highway 30, adjacent to the Illinois Central Gulf Railroad. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 61 ft, cased to 46 ft, slotted 40-46 ft, gravel-packed, open hole 46-61 ft. Open to Pennsylvanian shale, sandstone, and lignite 50-61 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,095 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.
REMARKS.--Well WC-189.
PERIOD OF RECORD.--May 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.14 ft below land-surface datum, May 30, 1984; lowest measured, 15.59 ft below land-surface datum, August 9, 1989.

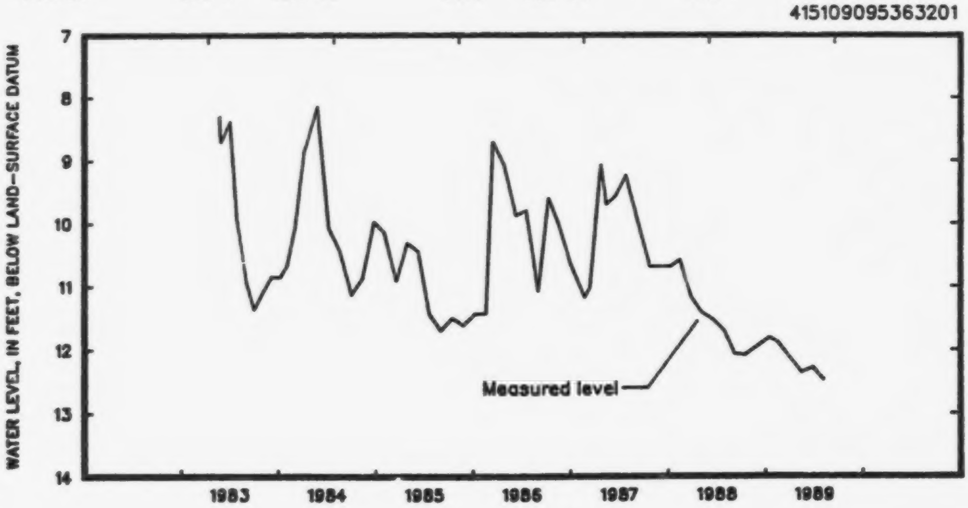
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 26, 1983	11.54	OCT 03	14.39	JUN 13	12.94	MAR 30	13.02
JUN 02	11.95	NOV 14	13.74	JUL 22	12.54	MAY 06	14.28
JUL 05	11.61	DEC 27	12.69	SEP 05	13.80	JUN 20	14.66
AUG 02	13.26	FEB 04, 1985	13.25	OCT 14	12.57	AUG 01	14.80
SEP 07	14.11	MAR 20	13.88	NOV 19	13.12	SEP 09	15.25
OCT 04	14.28	APR 30	13.20	JAN 02, 1987	13.58	OCT 17	15.00
NOV 08	14.09	JUN 11	12.97	MAR 18	13.82	DEC 02	14.91
DEC 08	13.85	JUL 24	14.49	APR 28	11.79	JAN 17, 1989	14.80
JAN 10, 1984	14.16	SEP 03	14.50	MAY 12	12.66	FEB 16	14.75
FEB 06	13.70	OCT 16	14.48	JUN 19	12.28	APR 06	14.97
MAR 07	13.26	NOV 26	14.40	JUL 29	12.21	MAY 18	15.52
APR 11	11.56	JAN 09, 1986	14.35	OCT 16	12.88	JUN 29	15.51
MAY 30	10.14	FEB 21	14.34	NOV 27	13.40	AUG 09	15.59
JUL 11	11.72	MAR 19	11.24	JAN 14, 1988	13.51		
AUG 21	13.74	MAY 01	11.45	FEB 16	13.40		

415109095363201. Local number, 81-41-03 CDBB1.
LOCATION.--Lat 41°51'09", long 95°36'32", Hydrologic Unit 10230007, in the southwest part of the Town of Dunlap, 0.25 mi west of U.S. Highway 30 and north of County Road F-14. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 50 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed, open hole 40-50 ft. Open to Cretaceous sandstone 40-50 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.30 ft above land-surface datum.
REMARKS.--Well WC-190.
PERIOD OF RECORD.--May 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.14 ft below land-surface datum, May 30, 1984; lowest measured, 12.47 ft below land-surface datum, August 9, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 26, 1983	8.30	OCT 03	11.12	JUN 13	9.87	MAR 30	11.16
JUN 01	8.70	NOV 14	10.86	JUL 22	9.79	MAY 06	11.40
JUL 06	8.38	DEC 27	9.97	SEP 05	11.07	JUN 20	11.52
AUG 02	9.94	FEB 04, 1985	10.15	OCT 14	9.60	AUG 01	11.70
SEP 07	10.96	MAR 20	10.91	NOV 19	9.99	SEP 09	12.06
OCT 04	11.36	APR 30	10.31	JAN 02, 1987	10.63	OCT 17	12.08
NOV 08	11.07	JUN 11	10.45	FEB 25	11.17	DEC 02	11.98
DEC 08	10.84	JUL 24	11.45	MAR 18	11.00	JAN 17, 1989	11.80
JAN 10, 1984	10.85	SEP 03	11.70	APR 28	9.07	FEB 16	11.87
FEB 06	10.65	OCT 16	11.50	MAY 18	9.68	MAY 18	12.35
MAR 07	10.05	NOV 26	11.62	JUN 19	9.56	JUN 29	12.27
APR 11	8.83	JAN 09, 1986	11.43	JUL 29	9.23	AUG 09	12.47
MAY 30	8.14	FEB 21	11.42	OCT 27	10.68	SEP 21	11.10
JUL 11	10.08	MAR 19	8.71	JAN 14, 1988	10.68		
AUG 20	10.44	MAY 01	9.09	FEB 16	10.57		



HARRISON COUNTY

415003095382301. Local number, 81-41-17 ABAA1.
LOCATION.--Lat 41°50'03", long 95°38'23", Hydrologic Unit 10230007, 2.5 mi southwest of the Town of Dunlap, 1 mi west of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 166 ft, cased to 166 ft, slotted from 149-166 ft, gravel-packed. Open to Pennsylvanian shale 158-166 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,135 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.55 ft above land-surface datum.
REMARKS.--Well WC-11.
PERIOD OF RECORD.--June 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 65.77 ft below land-surface datum, May 3, 1983; lowest measured, 72.45 ft below land-surface datum, June 26, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 26, 1981	72.45	JUL 06	66.73	JUN 11	69.39	JUL 29	67.51
JUL 28	71.92	AUG 02	67.90	JUL 24	70.03	OCT 16	68.78
NOV 03	72.43	SEP 07	67.34	SEP 03	70.57	NOV 27	69.43
JAN 13, 1982	72.19	OCT 04	69.14	OCT 16	70.89	JAN 14, 1988	69.53
APR 06	71.40	NOV 08	69.74	NOV 26	70.94	FEB 16	69.39
MAY 07	71.41	DEC 13	69.63	JAN 09, 1986	70.77	MAR 30	70.06
JUN 03	69.55	JAN 11, 1984	69.71	FEB 21	70.81	MAY 06	70.36
JUL 02	70.22	FEB 06	69.79	MAR 19	68.56	JUN 20	70.49
AUG 03	70.16	MAR 07	69.82	MAY 01	68.70	AUG 01	70.74
SEP 09	70.94	APR 11	67.85	JUN 13	69.05	SEP 09	71.23
OCT 07	70.37	MAY 30	66.14	JUL 22	68.67	OCT 17	71.16
NOV 01	70.40	JUL 11	66.12	SEP 05	69.46	DEC 02	71.30
DEC 02	69.97	AUG 20	66.59	OCT 14	68.08	JAN 17, 1989	71.00
JAN 03, 1983	69.38	OCT 03	69.23	NOV 19	67.91	FEB 16	71.47
FEB 08	69.47	NOV 14	69.39	JAN 02, 1987	69.12	APR 06	71.25
MAR 10	66.99	DEC 27	69.08	FEB 25	69.87	MAY 18	71.45
APR 12	66.47	FEB 04, 1985	69.14	MAR 18	69.62	JUN 29	71.51
MAY 03	65.77	MAR 20	69.84	APR 28	67.68	AUG 09	71.67
JUN 02	66.75	APR 30	69.24	JUN 19	68.00	SEP 21	70.85

414702095395101. Local number, 81-41-31 BDDD1.
LOCATION.--Lat 41°47'02", long 95°39'51", Hydrologic Unit 10230007, approximately 4 mi northeast of the Town of Woodbine, on the east side of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Boyer alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 30 ft, slotted 24-30 ft, gravel-packed.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,065 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.
REMARKS.--Well WC-53.
PERIOD OF RECORD.--June 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.61 ft below land-surface datum, May 3, 1983; lowest measured, 12.51 ft below land-surface datum, August 9, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 04, 1982	8.49	DEC 03	9.45	NOV 25	10.37	JAN 14, 1988	9.36
JUL 07	8.82	JAN 11, 1984	9.35	JAN 09, 1986	10.13	FEB 16	8.23
AUG 03	9.69	FEB 07	9.24	FEB 21	10.08	MAR 30	9.80
SEP 09	10.40	MAR 07	8.48	MAR 19	7.40	MAY 06	10.10
OCT 07	8.76	APR 11	7.40	MAY 01	7.24	JUN 20	10.28
NOV 01	9.38	MAY 30	5.68	JUN 13	8.79	AUG 01	10.78
DEC 02	9.30	JUL 11	6.28	JUL 22	8.28	SEP 09	11.43
JAN 03, 1983	7.84	AUG 21	8.57	SEP 05	9.37	OCT 17	11.78
FEB 08	8.84	OCT 03	9.44	OCT 14	6.90	DEC 02	11.48
MAR 10	5.14	NOV 14	9.40	NOV 19	7.81	JAN 17, 1989	10.35
APR 12	4.93	DEC 27	8.19	JAN 02, 1987	9.13	FEB 16	10.55
MAY 03	4.61	FEB 04, 1985	8.90	FEB 25	9.75	APR 06	11.47
JUN 02	6.62	MAR 20	9.55	MAR 18	9.70	MAY 18	12.13
JUL 06	6.57	MAY 01	8.77	APR 28	7.65	JUN 29	12.20
AUG 02	8.23	JUN 11	8.98	MAY 12	8.21	AUG 09	12.51
SEP 07	9.42	JUL 25	9.88	JUN 19	8.10		
OCT 04	9.70	SEP 03	10.28	JUL 27	6.75		
NOV 08	9.73	OCT 16	10.41	OCT 27	9.41		

HARRISON COUNTY

414700095373001. Local number, 81-41-33 CAAA1.
LOCATION.--Lat 41°47'00", long 95°37'30", Hydrologic Unit 10230007, approximately 4.5 mi south of the Town of Dunlap, and 2 mi east of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 169 ft, cased to 155 ft, slotted 145-154 ft, gravel-packed.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,182 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.90 ft above land-surface datum.
REMARKS.--Well WC-52.
PERIOD OF RECORD.--June 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 72.54 ft below land-surface datum, July 27, 1987; lowest measured, 85.03 ft below land-surface datum, June 4, 1982.

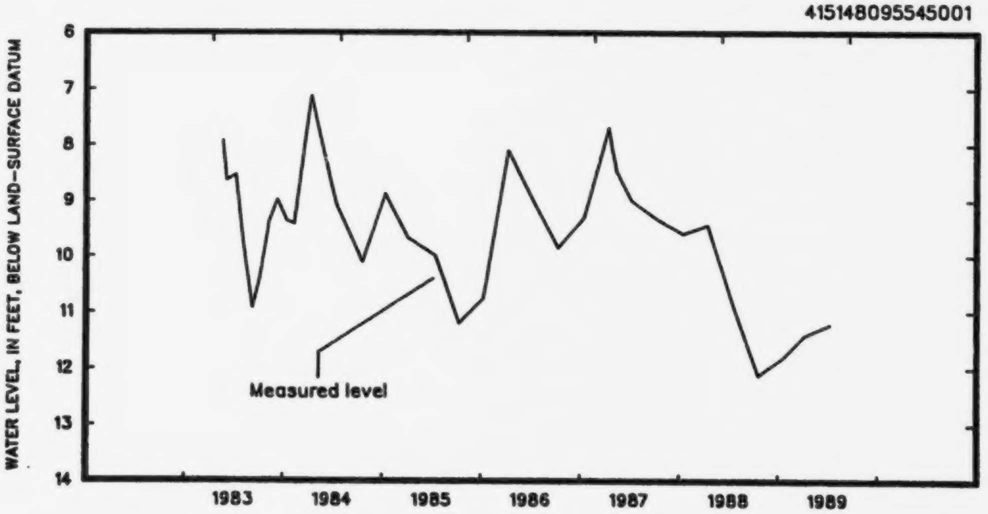
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1981 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 04, 1982	85.03	NOV 08	78.30	NOV 26	77.42	JAN 14, 1988	73.78
JUL 07	84.94	DEC 13	78.47	JAN 09, 1986	77.74	FEB 16	74.04
AUG 04	84.30	JAN 11, 1984	78.65	FEB 21	78.09	MAR 30	74.55
SEP 09	84.40	FEB 07	78.92	MAR 19	77.20	MAY 06	74.88
OCT 07	83.71	MAR 07	78.28	MAY 01	76.82	JUN 20	75.53
NOV 01	83.57	APR 11	77.10	JUN 13	75.90	AUG 01	75.83
DEC 02	82.96	MAY 30	75.28	JUL 22	74.08	SEP 09	75.43
JAN 03, 1983	82.88	JUL 12	73.42	SEP 05	74.63	OCT 17	76.76
FEB 08	82.09	AUG 22	73.40	OCT 14	73.99	DEC 02	76.05
MAR 10	80.08	OCT 03	75.20	NOV 19	73.31	JAN 17, 1989	77.43
APR 12	78.49	NOV 14	75.39	JAN 02, 1987	73.95	FEB 16	77.94
MAY 03	77.23	FEB 04, 1985	75.70	FEB 25	74.62	APR 06	77.95
JUN 02	76.92	MAR 20	75.55	MAR 18	74.57	MAY 18	78.28
JUL 06	77.17	JUN 11	73.37	APR 28	73.26	JUN 29	78.77
AUG 02	77.32	JUL 24	76.27	JUN 19	73.21	AUG 09	78.78
SEP 07	77.96	SEP 03	76.79	JUL 27	72.54		
OCT 04	78.79	OCT 16	76.30	NOV 27	73.41		

415148095545001. Local number, 81-44-01 ABAB1.
LOCATION.--Lat 41°51'48", long 95°54'50", Hydrologic Unit 10230001, approximately 2 mi north of the Town of Pisgah on the west side of Iowa Highway 183. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Soldier alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 61 ft, cased to 58 ft, slotted 53-58 ft, gravel packed, open hole 58-61 ft. Pleistocene glacial drift 57-61 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,065 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.80 ft above land-surface datum.
REMARKS.--Well WC-177.
PERIOD OF RECORD.--May 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.13 ft below land-surface datum, April 11, 1984; lowest measured, 12.12 ft below land-surface datum, October 17, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 18, 1983	7.92	FEB 07	9.42	APR 07	8.10	APR 11	9.44
JUN 02	8.63	MAR 07	8.37	JUL 07	8.99	JUL 18	10.93
JUL 06	8.53	APR 11	7.13	OCT 08	9.85	OCT 17	12.12
AUG 02	9.71	JUL 12	9.09	JAN 12, 1987	9.30	JAN 19, 1989	11.79
SEP 07	10.92	OCT 15	10.11	APR 13	7.69	APR 03	11.42
OCT 04	10.39	JAN 07, 1985	8.88	MAY 13	8.48	JUL 07	11.22
NOV 07	9.36	APR 01	9.68	JUL 06	9.00		
DEC 06	8.98	JUL 11	10.00	OCT 07	9.33		
JAN 11, 1984	9.37	OCT 07	11.20	JAN 11, 1988	9.60		
		JAN 06, 1986	10.75				

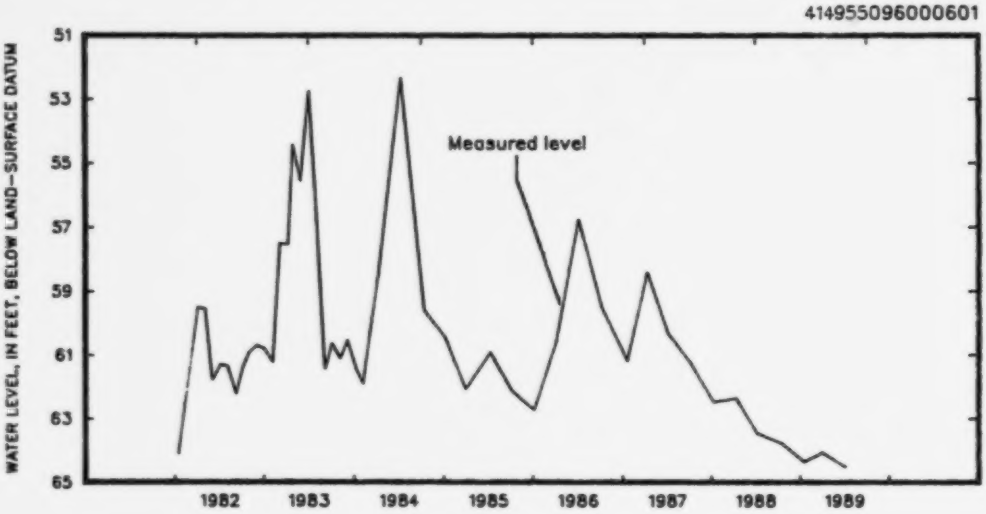


HARRISON COUNTY

414955096000601. Local number, 81-44-18 AADA1.
LOCATION.--Lat 41°49'55", long 96°00'06", Hydrologic Unit 10230003, approximately 1.8 mi northeast of the Town of Little Sioux, just west of Iowa Highway 301. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Pennsylvanian: in sandstone of Pennsylvanian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 126 ft, cased to 126 ft, perforated 108-126 ft, gravel-packed. Open to Pleistocene glacial drift 108-112 ft. Original depth 209 ft, casing plugged at 126 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,075 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.
REMARKS.--Well WC-23.
PERIOD OF RECORD.--January 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 52.33 ft below land-surface datum, July 12, 1984; lowest measured, 64.50 ft below land-surface datum, July 7, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	63.76	JAN 19	64.34	APR 03	64.04	JUL 07	64.50



HENRY COUNTY

405810091330502. Local number, 71-06-09 ABAC2.
LOCATION.--Lat 40°58'10", long 91°33'05", Hydrologic Unit 07080107, in the city water plant on Adams Street, Mount Pleasant. Owner: City of Mount Pleasant.
AQUIFER.--Cambrian-Ordovician: in sandstone and sandy dolomite of Late Cambrian and Early Ordovician age.
WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 20 to 19 in., depth 1,860 ft, cased to 623 ft, open hole 623-1,860 ft. Open from the Middle Devonian Cedar Valley Formation into the Late Cambrian St. Lawrence Formation.
METHOD.--Quarterly airline measurement by personnel from the City of Mt. Pleasant, checked by USGS personnel.
DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base, 2.25 ft above land-surface datum.
REMARKS.--City well No. 4. Water levels affected by pumping.
PERIOD OF RECORD.--April 1946 to December 1950, January 1953 to March 1957 and May 1959 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 132.00 ft below land-surface datum, May 5, 1946; lowest measured, nonpumping, 208.25 ft below land-surface datum, February 25, 1987.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 20	p228.25	MAR 22	p231.25	JUL 21	p234.25	AUG 22	p234.25

p Well being pumped.

HENRY COUNTY

405741091334501. Local number, 71-06-09 CBCA1.
LOCATION.--Lat 40°57'41", long 91°33'45", Hydrologic Unit 07080107, at Saunders Park in the southwest part of Mount Pleasant. Owner: City of Mount Pleasant.
AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandy dolomite of Early Ordovician age.
WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 16 to 6 in., depth 1,896 ft, cased to 1,689 ft, open hole 1,689-1,896 ft. Well deepened from 1,802 ft to 1,896 ft in 1955.
METHOD.--Quarterly airline measurement by personnel from the City of Mt. Pleasant, checked by USGS personnel.
DATUM.--Elevation of land-surface datum is 670 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.32 ft below land-surface datum.
REMARKS.--City well No. 3. Water levels affected by pumping.
PERIOD OF RECORD.--September 1945 to February 1958 and November 1961 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 71.60 ft below land-surface datum, December 31, 1945; lowest measured (pumping), 259.32 ft below land-surface datum, January 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

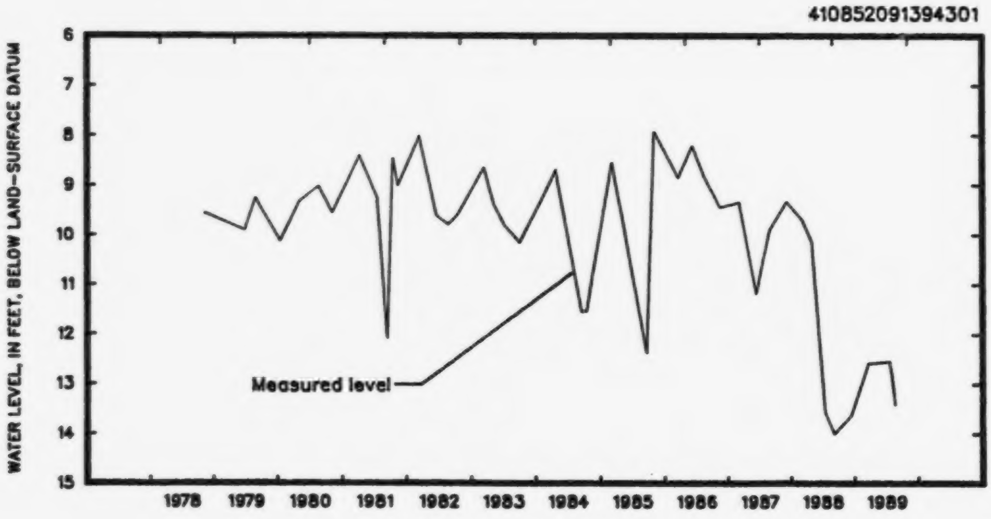
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 20	p215.32	MAR 23	157.32	JUL 21	157.32	AUG 24	175.32

p Well being pumped.

410852091394301. Local number, 73-07-09 AABD1.
LOCATION.--Lat 41°08'52", long 91°39'43", Hydrologic Unit 07080107, north of Main Street near the water tower, Wayland. Owner: Town of Wayland.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Dug unused water-table well, diameter 4 ft, depth 52 ft. Casing information not available.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of cement cover, 0.21 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--September 1960 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.30 ft below land-surface datum, September 1, 1965; lowest measured, 14.69 ft below land-surface datum, February 15, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 14	13.63	JUL 21	12.55	AUG 02	12.77	AUG 24	13.43
MAR 22	12.59						



HUMBOLDT COUNTY

424039094103601. Local number, 91-28-20 CAAA.
LOCATION.--Lat 42°40'39", long 94°10'36", Hydrologic Unit 07100004, approximately 3 mi south of the Town of Dakota City, on the west side of County Road P-56. Owner: Elmer Gravdlund.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Unused water-table well, diameter 3 ft, cribbed with filed stone, depth 24.5 ft, casing information unavailable.
METHOD.--Monthly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,135 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, at land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--July 1988 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.65 ft below land-surface datum, July 14, 1988; lowest measured, 16.72 ft below land-surface datum, March 16, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1987 TO SEPTEMBER 1989

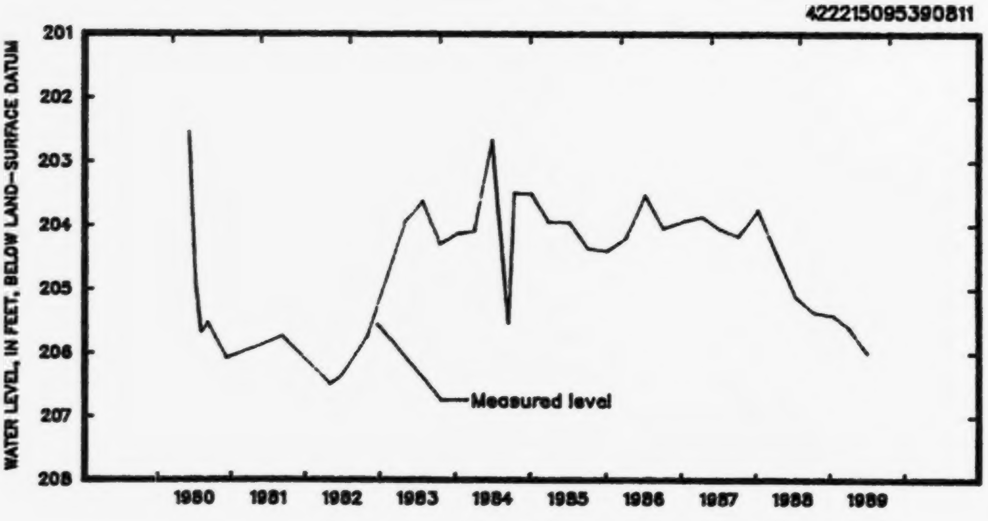
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 14, 1988	13.65	NOV 14	15.46	MAR 16	16.72	JUL 10	15.88
AUG 15	14.35	DEC 15	15.90	APR 12	16.63	AUG 14	15.04
SEP 13	14.11	JAN 13, 1989	15.84	MAY 15	16.19	SEP 15	14.88
OCT 11	14.77	FEB 15	16.25	JUN 15	15.90		

IDA COUNTY

422215095390811. Local number, 87-41-05 CCCC11.
LOCATION.--Lat 42°22'15", long 95°39'08", Hydrologic Unit 10230005, approximately 0.75 mi east and 6.5 mi south of the Village of Cushing. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 490 ft, cased to 490 ft, perforated 301-305 ft. Original depth 510 ft, cemented back to 490 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,344 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.72 ft above land-surface datum.
REMARKS.--Well D-10.
PERIOD OF RECORD.--June 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 202.55 ft below land-surface datum, June 4, 1980; lowest measured, 206.50 ft below land-surface datum, May 7, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	205.38	JAN 19	205.42	APR 04	205.61	JUL 05	206.01



IDA COUNTY

423107095383201. Local number, 89-41-13 CCCC1.
LOCATION.--Lat 42°31'07", long 95°38'32", Hydrologic Unit 10230003, at a roadside park on County Road D-15, approximately 1.5 mi east and 3.5 mi north of the Village of Cushing. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Mississippian: in limestone of Mississippian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 469 ft, cased to 465 ft, sand point 465-468 ft, open hole 468-469 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.11 ft above land-surface datum.
REMARKS.--Well D-9.
PERIOD OF RECORD.--December 1978 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 186.45 ft below land-surface datum, July 27, 1983; lowest measured, 244.55 ft below land-surface datum, July 9, 1980.
REVISION.--Lowest water level measured, 244.55 ft below land-surface datum, July 9, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	190.48	JAN 19	190.82	APR 04	190.89	JUL 05	191.07

IOWA COUNTY

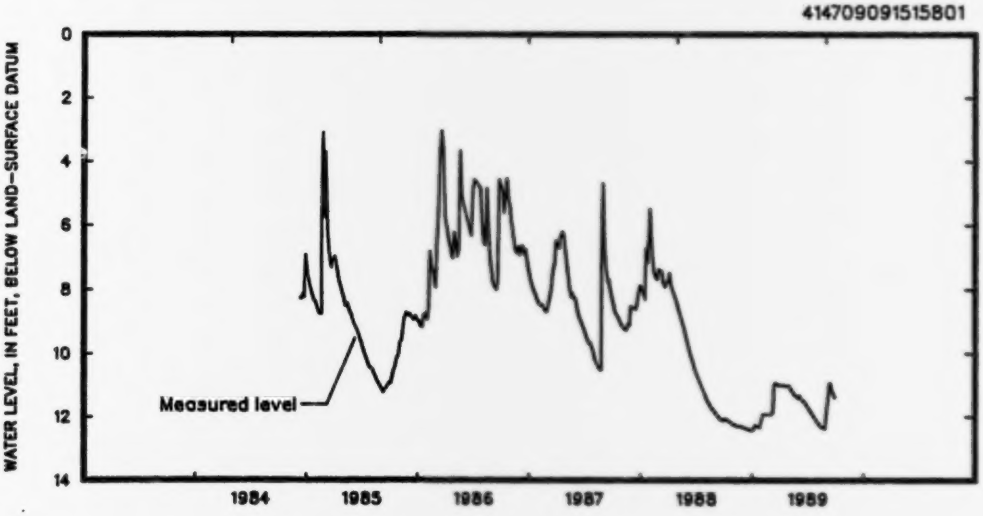
414709091515801. Local number, 81-09-35 BCAA1.
LOCATION.--Lat 41°47'09", long 91°51'58", Hydrologic Unit 07080208, approximately 400 ft northwest of the Iowa River, east of Iowa Highway 149, and approximately 1.1 mi south of the Village of Amana. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 10 in, depth 27 ft, cased to 18 ft, screened 18-27 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 710 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.0 ft above land-surface datum.
REMARKS.--Well IRA-24.
PERIOD OF RECORD.--December 1984 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 2.90 ft below land-surface datum, February 24, 1985; lowest recorded, 12.45 ft below land-surface datum, December 31, 1988, and January 3, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
NOON VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	----	12.28	12.36	12.43	11.96	11.93	-----	11.11	11.35	11.75	12.21	-----
10	12.11	12.33	12.39	12.28	11.93	11.89	-----	11.20	11.45	11.83	12.28	-----
15	12.16	12.33	12.41	12.31	11.95	11.01	-----	11.25	a11.50	11.90	12.33	10.98
20	12.17	12.30	12.42	12.35	11.94	10.95	-----	11.34	11.55	-----	12.37	11.20
25	12.23	12.33	12.44	12.34	11.95	11.03	-----	11.36	11.60	-----	12.39	11.34
EOM	12.26	12.35	12.45	12.13	11.96	11.02	-----	11.44	11.68	12.14	-----	11.42

WTR YEAR 1989 HIGHEST 10.91 MAY 17, 1989 LOWEST 12.45 DECEMBER 31, 1988 and JANUARY 3, 1989

a Recorded water level has been adjusted.



IOWA COUNTY

414930092093801. Local number, 81-11-17 CBBC1.
LOCATION.--Lat 41°49'30", long 92°09'38", Hydrologic Unit 07080208, approximately 2.2 mi east of the Village of Koszta and 0.5 mi south of the Iowa River. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 30 ft, cased to 27 ft, screened 27-30 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.60 ft above land-surface datum.
REMARKS.--Well IRA-6. Replaces well IRA 10-B. Records for 1984 to July 1986 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--October 1984 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.64 ft below land-surface datum, May 28, 1986; lowest measured, 10.55 ft below land-surface datum, January 3, 1989.

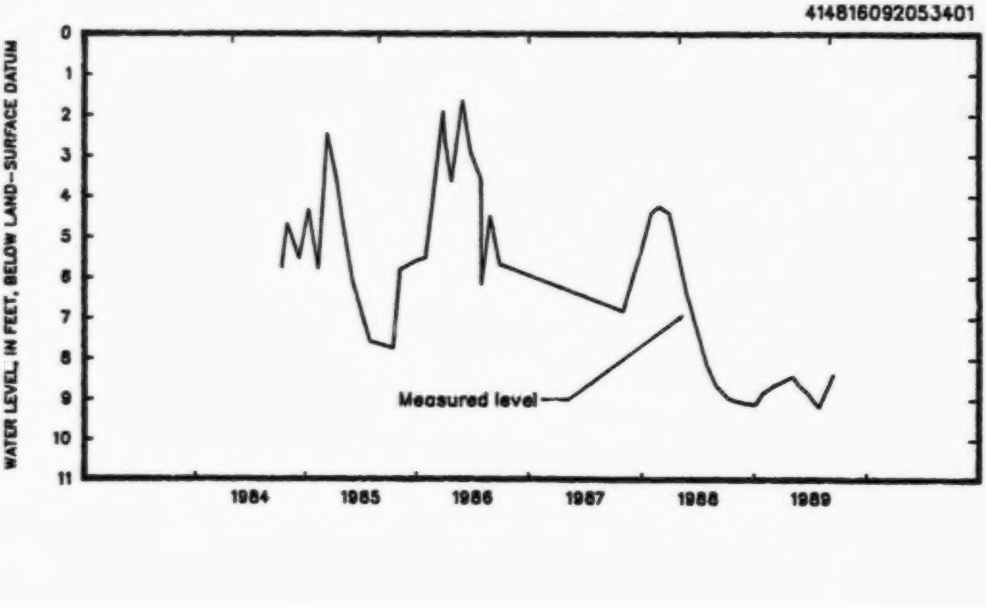
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	10.29	JAN 03	10.55	MAY 04	9.78	JUL 27	10.34
27	10.49	26	10.47	24	9.91	SEP 13	9.49
NOV 28	10.49	MAR 02	10.17	JUN 20	10.08		

414816092053401. Local number, 81-11-23 DCCC1.
LOCATION.--Lat 41°48'16", long 92°05'34", Hydrologic Unit 07080208, approximately 0.75 mi west of the Town of Marengo, 0.5 mi north of Iowa Highway 212 and 0.5 mi south of the Iowa River. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 31 ft, cased to 28 ft, screened 28-31 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.30 ft above land-surface datum.
REMARKS.--Well IRA-4A. Replaces well IRA-10A. Records for 1984 to July 1986 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--October 1984 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.65 ft below land-surface datum, May 28, 1986; lowest measured, 9.19 ft below land-surface datum, July 27, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	8.97	JAN 03	9.13	MAY 04	8.43	JUL 27	9.19
27	9.04	26	8.85	24	8.65	SEP 13	8.38
NOV 28	9.10	MAR 02	8.66	JUN 20	8.83		



IOWA COUNTY

415125092164201. Local number, 81-12-06 ADDA1.

LOCATION.--Lat 41°51'25", long 92°16'42", Hydrologic Unit 07080208, approximately 800 ft south of the Iowa River, west side of Iowa Highways 21 and 212, approximately 2 mi south of the Town of Belle Plaine. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Iowa alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in, depth 36 ft, cased to 33 ft, screened 33-36 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 765 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.60 ft above land-surface datum.

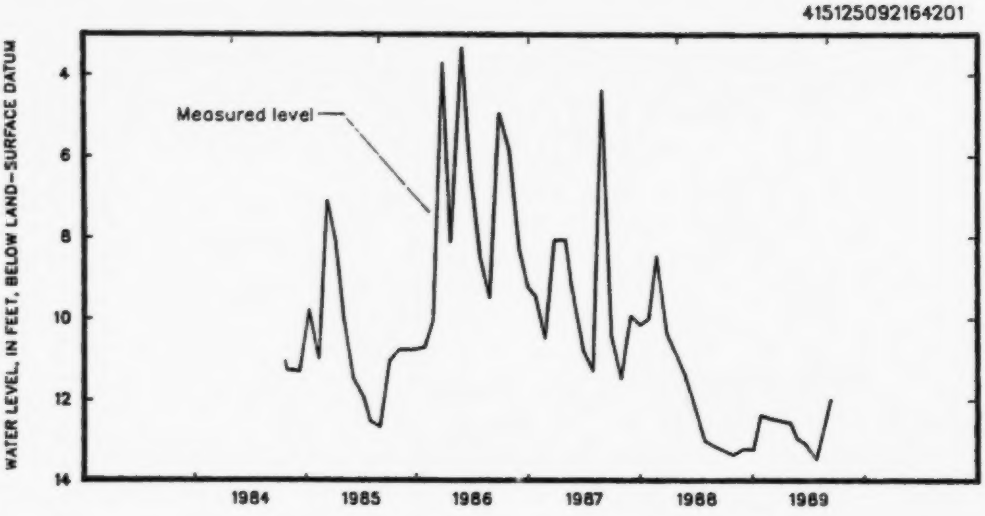
REMARKS.--Well IRA-14.

PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.35 ft below land-surface datum, May 28, 1986; lowest measured, 13.47 ft below land-surface datum, July 27, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	13.29	JAN 03	13.23	MAY 04	12.58	JUL 27	13.47
27	13.37	26	12.38	24	12.95	SEP 13	11.99
NOV 28	13.22	MAR 02	12.47	JUN 20	13.09		



JACKSON COUNTY

420842090165701. Local number, 85-6E-29 ACAD1.

LOCATION.--Lat 42°08'42", long 90°16'57", Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.

AQUIFER.--Dresbach: in Mt. Simon sandstone of Early Cambrian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in. depth 1,804 ft, cased to 1,705 ft, screened 1,705-1,725 ft, open hole 1,725-1,804 ft.

METHOD.--Monthly measurement with engineers rule by USGS personnel.

DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Mark on angle iron attached to well house, 6.05 ft above land-surface datum.

REMARKS.--Flowing well. Green Island #1.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.81 ft above land-surface datum, May 16, 1988; lowest measured, 7.67 ft above land-surface datum, September 6, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 22	-10.36	FEB 27	-10.54	MAY 08	-10.37	AUG 06	-10.19
DEC 14	-10.90	MAR 15	-10.46	JUN 26	-10.33		
JAN 05	-10.73	APR 04	-10.81	AUG 01	-9.98		

JACKSON COUNTY

420842090165703. Local number, 85-6E-29 ACAD3.
LOCATION.--Lat 42°08'42", long 90°16'57", Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.
AQUIFER.--Cambrian-Ordovician: in Prairie du Chien dolomite of Early Ordovician age and St. Peter sandstone of Middle Ordovician age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 910 ft, cased to 604.2 ft, screened 604.2-624.2 ft, open hole 624.2- 910 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.
REMARKS.--Green Island #3.
PERIOD OF RECORD.--May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD. -Highest water level measured, 5.19 ft below land-surface datum, January 8, 1986; lowest measured 9.90 ft below land-surface datum, August 31, 1983.

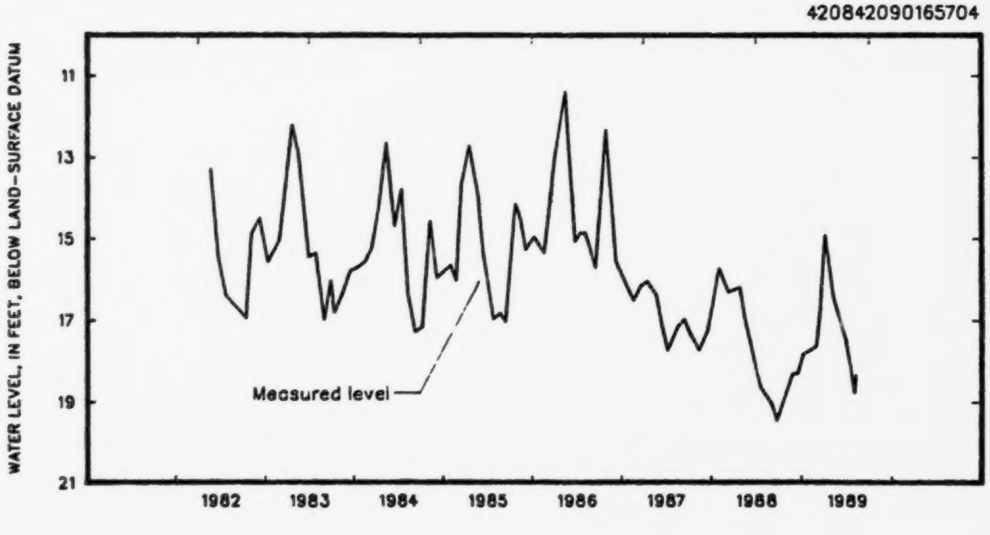
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 22	7.59	FEB 27	7.47	MAY 08	7.57	AUG 06	8.00
DEC 14	7.00	MAR 15	7.30	JUN 26	7.86		
JAN 05	7.22	APR 04	7.17	AUG 01	8.38		

420842090165704. Local number, 85-6E-29 ACAD4.
LOCATION.--Lat 42°08'42", long 90°16'57", Hydrologic Unit 07060005, 1 mi east of U.S. Highway 52, 2 mi southeast of the Village of Green Island beside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in the Upper Mississippi River Wildlife and Fish Refuge. Owner: U.S. Geological Survey.
AQUIFER.--Cambrian-Ordovician: in Galena dolomite of Middle Ordovician age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 400 ft, cased to 299.6 ft, screened 299.6-319.6 ft, open hole 319.6-400 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 610 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.
REMARKS.--Green Island #4.
PERIOD OF RECORD.--May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.40 ft below land-surface datum May 15, 1986; lowest measured, 19.46 ft below land-surface datum, September 20, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 22	18.32	FEB 27	17.63	MAY 08	16.47	AUG 06	18.36
DEC 14	18.29	MAR 15	16.73	JUN 26	17.49		
JAN 05	17.84	APR 04	14.93	AUG 01	18.78		



JASPER COUNTY

414210092592001. Local number, 80-18-31 ABBB1.
LOCATION.--Lat 41°42'10", long 92°59'20", Hydrologic Unit 07080105, approximately 3 mi east of the City of Newton just south of U.S. Highway 6. Owner: P.W. Beukema.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Dug stock water-table well, diameter 36 in., depth 37 ft, cribbed with brick.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 940 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of cement platform, 0.70 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--February 1940 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.67 ft below land-surface datum, June 10, 1947; lowest measured, 27.15 ft below land-surface datum, December 18, 1948.

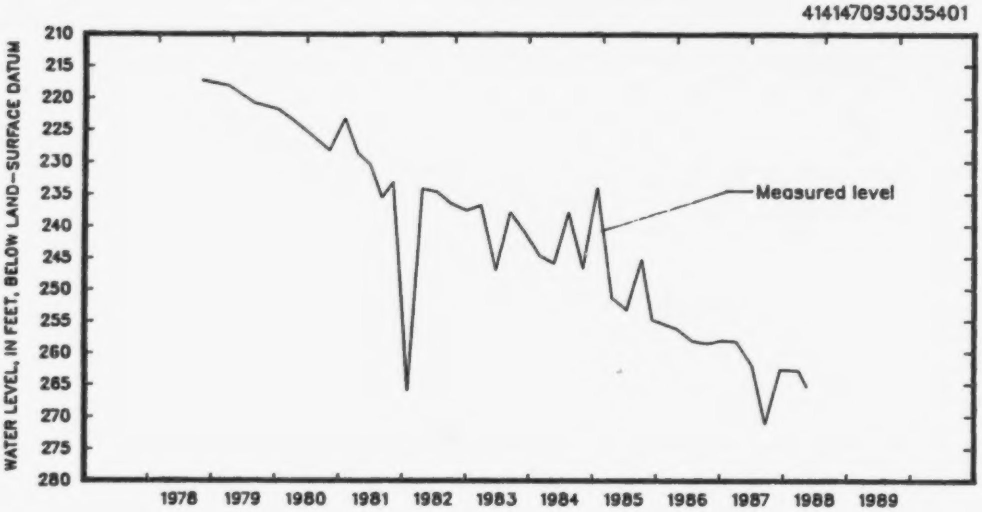
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 14	14.50	FEB 10	14.97	APR 07	16.30	JUL 20	11.32

414147093035401. Local number, 80-19-33 ACAC1.
LOCATION.--Lat 41°41'50", long 93°03'53", Hydrologic Unit 07080105, 231 West 10th Street, Newton. Owner: John Coppess.
AQUIFER.--Cambrian-Ordovician: in sandstone and sandy dolomite of Late Cambrian and Early Ordovician age.
WELL CHARACTERISTICS.--Drilled unused private artesian water well, diameter 12 to 6 in., depth 2,567 ft, cased to 1,750 ft, open hole 1,750-2,567 ft. Open to 461 ft of Early Ordovician Prairie du Chien formation, 262 ft of Late Cambrian St. Lawrence formation, and 94 ft of Middle Cambrian Franconia formation.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 915 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in cement well cover, 0.50 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--September 1963 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 98.43 ft below land-surface datum, June 14, 1966; lowest measured, 272.07 ft below land-surface datum, July 20, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 14	268.94	FEB 10	269.80	APR 27	269.73	JUL 20	272.07



JOHNSON COUNTY

414107091322901. Local number, 79-06-04 AAAA1.
LOCATION.--Lat 41°41'07", long 91°32'29", Hydrologic Unit 07080209, at Forest View Trailer Court, northern edge of Iowa City. Owner: Forest View Trailer Court.
AQUIFER.--Silurian: in limestone of Silurian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 280 ft, cased to 96 ft, open hole 96-280 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to top of casing, 1.62 ft above land-surface datum.
REMARKS.--Water levels affected by wells in the area pumping in late spring, summer, and early fall. Water-level recorder removed October 1986.
PERIOD OF RECORD.--May 1971 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 96.93 ft below land-surface datum, March 23, 1979; lowest measured, 148.60 ft below land-surface datum, August 2, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

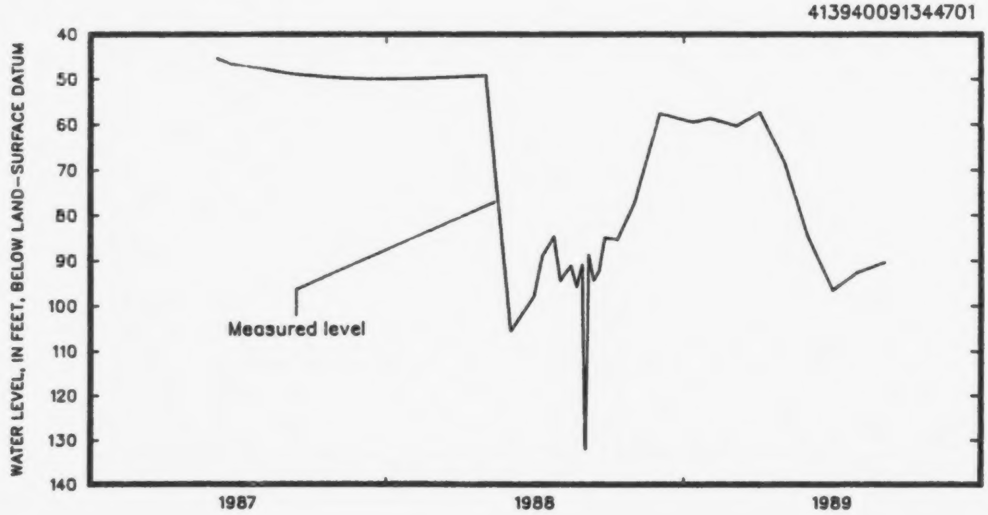
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	140.04	JAN 11	124.60	APR 04	122.09	JUL 03	147.84
NOV 01	133.47	FEB 02	124.49	MAY 05	131.00	AUG 02	148.60
DEC 02	120.51	MAR 06	124.89	JUN 02	142.11	SEP 05	144.76

413940091344701. Local number, 79-06-07 DAAC1.
LOCATION.--Lat 41°39'40", long 91°34'47", Hydrologic Unit 07080209, in Iowa City, north of Hawkeye Village (married student housing), University of Iowa, and north of County Road F-46. Owner: University of Iowa.
AQUIFER.--Silurian: in limestone and dolomite of Silurian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 400 ft, cased to 211 ft, open hole 211-400 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 685 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.81 ft above land-surface datum.
REMARKS.--Hawkeye Village #1. Water levels affected by wells in the area pumping in late spring, summer, and early fall.
PERIOD OF RECORD.--June 1987 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 45.51 ft below land-surface datum, June 5, 1987; lowest measured, 132.12 ft below land-surface datum, September 2, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1986 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 05, 1987	45.51	APR 11	49.48	22	95.37	FEB 02	58.77
22	46.83	MAY 02	49.39	29	90.66	MAR 06	60.57
JUL 06	47.21	JUN 02	p105.74	SEP 02	p132.12	APR 04	57.49
AUG 05	48.04	JUL 01	97.84	06	88.57	MAY 05	68.66
SEP 04	49.04	11	95.51	12	94.57	JUN 02	84.66
OCT 05	49.49	18	89.05	19	92.33	JUL 03	96.76
NOV 05	50.00	25	84.80	26	84.63	AUG 02	92.76
DEC 04	50.17	AUG 01	93.25	OCT 11	85.59	SEP 05	90.52
JAN 04, 1988	50.13	02	94.66	NOV 01	77.40		
FEB 05	50.01	08	92.96	DEC 02	57.73		
MAR 07	49.79	15	91.36	JAN 11, 1989	59.73		

p Near by well being pumped.



JOHNSON COUNTY

413925091324001. Local number, 79-06-09 DDBC1.

LOCATION.--Lat 41°39'34", long 91°32'42", Hydrologic Unit 07080209, at the Quadrangle Dormitory, University of Iowa, Iowa City. Owner: University of Iowa.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 430.5 ft, cased to 225 ft, open hole 225-430.5 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 714 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.81 ft above land-surface datum.

REMARKS.--Water levels affected by nearby wells pumping in late spring, summer, and early fall.

PERIOD OF RECORD.--April 1975 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 74.63 ft below land-surface datum, March 21, 1979; lowest measured, 167.63 ft below land-surface datum, August 2, 1988.

REVISION.--Highest water level measured, 74.63 ft below land-surface datum, March 21, 1979.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	149.92	JAN 11	103.49	APR 04	97.22	JUL 03	162.91
NOV 01	132.82	FEB 02	100.81	MAY 05	125.64	AUG 02	157.20
DEC 02	102.22	MAR 06	100.49	JUN 02	146.49	SEP 05	155.86

413955091320303. Local number, 79-06-10 BDBC3.

LOCATION.--Lat 41°39'58", long 91°32'06", Hydrologic Unit 07080209, at the Currier Hall Dormitory, University of Iowa, Iowa City. Owner: University of Iowa.

AQUIFER.--Silurian-Devonian: in limestone and dolomite of Silurian and Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 12 in., depth 425 ft, cased to 160 ft, open hole 160-425 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 707 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 7.76 ft below land-surface datum.

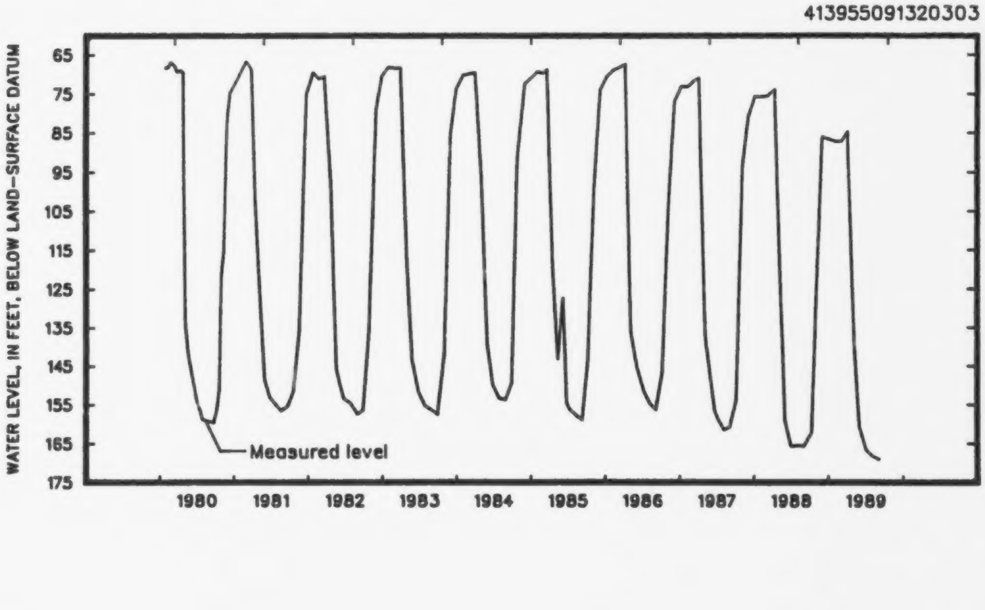
REMARKS.--Water levels affected by nearby wells pumping in late spring, summer, and early fall.

PERIOD OF RECORD.--October 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 62.12 ft below land-surface datum, April 23, 1973; lowest measured, 169.22 ft below land-surface datum, September 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	162.21	JAN 11	86.96	APR 04	84.74	JUL 03	166.72
NOV 01	129.10	FEB 02	87.33	MAY 08	140.46	AUG 02	168.29
DEC 02	86.06	MAR 06	87.19	JUN 02	160.98	SEP 05	169.22



JOHNSON COUNTY

413844091323201. Local number, 79-06-16 DDAD1.
LOCATION.--Lat 41°38'44", long 91°32'32", Hydrologic Unit 07080209, 1223 South Riverside Drive, Iowa City. Owner: Iowa City Community School District.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 363 ft, cased to 66.5 ft, open hole 66.5-363 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 652 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.12 ft above land-surface datum.
REMARKS.--Warehouse well. Water levels affected by wells in the area pumping in late spring, summer, and early fall. Main water, 214-215 ft, in the Silurian.
PERIOD OF RECORD.--April 1974 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.96 ft below land-surface datum, April 11, 1979; lowest measured, 41.50 ft below land-surface datum, July 1, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

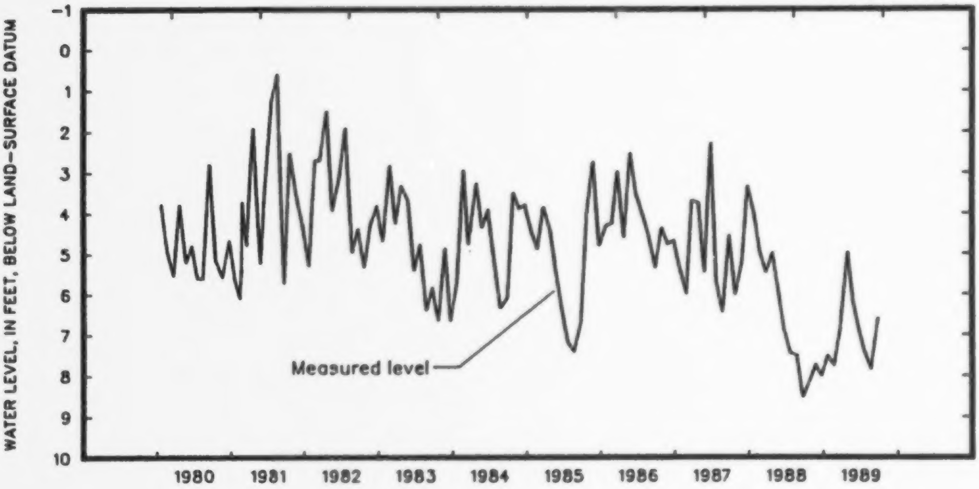
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	32.26	JAN 11	19.82	APR 04	18.35	JUL 03	36.12
NOV 01	31.08	FEB 02	19.80	MAY 05	20.85	AUG 02	35.24
DEC 02	23.13	MAR 06	19.62	JUN 02	30.74	SEP 05	34.16

414458091260201. Local number, 80-05-09 DBBC1.
LOCATION.--Lat 41°44'58", long 91°26'02", Hydrologic Unit 07080209, in the southeast corner of the T junction of County Roads F8W and F36 in the Village of Morse. Owner: Mrs. Frank Miller.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1.25 in., depth 15 ft, cased to 13 ft, sand point 13-15 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 762 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 2.72 ft above land-surface datum.
REMARKS.--Records for 1950 to September 1985 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--August 1950 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.60 ft above land-surface datum, March 14, 1953; lowest measured, 9.22 ft below land-surface datum, September 8, 1955.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	8.14	JAN 20	7.52	APR 27	4.98	JUL 21	7.44
NOV 23	7.74	FEB 22	7.76	MAY 25	6.18	AUG 21	7.84
DEC 21	8.01	MAR 23	6.87	JUN 23	6.89	SEP 25	6.59

414458091260201



JOHNSON COUNTY

414315091252001. Local number, 80-05-22 CBCB1.
LOCATION.--Lat 41°43'15", long 91°25'20", Hydrologic Unit 07080209, along the Chicago, Rock Island and Pacific Railroad track, southeast of the overpass on Rapid Creek Road over the track, approximately 5.5 mi northeast of the junction of Interstate 80 and Iowa Highway 1. Owner: Chicago, Rock Island and Pacific Railroad Co.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 2.25 in., depth 18.43 ft, cased to 18 ft, screened 18-20 ft. Depth originally 20 ft, re-measured June 23, 1989.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 4.47 ft above land-surface datum.
REMARKS.--At the site of the former Elmira depot.
PERIOD OF RECORD.--October 1941 to September 1956, January 1958 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.78 ft below land-surface datum, September 20, 1977; lowest measured, dry, November 10, 15, 20, 25, and 30, 1964, December 5, 10, 15, 20,25 and 31, 1964, December 1 and 10, 1975, October 21, 1976, November 23, 1976, December 17, 1976, January 20, 1977, and February 18, 1977.
REVISIONS.--Lowest water level measured, dry, November 10, 15, 20, 25, and 30, 1964, December 5, 10, 15, 20, 25, and 31, 1964, Dec. 1 and 10, 1975, Oct. 21, 1976, Nov. 23, 1976, Dec. 17, 1976, Jan. 20, 1977, and Feb. 18, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

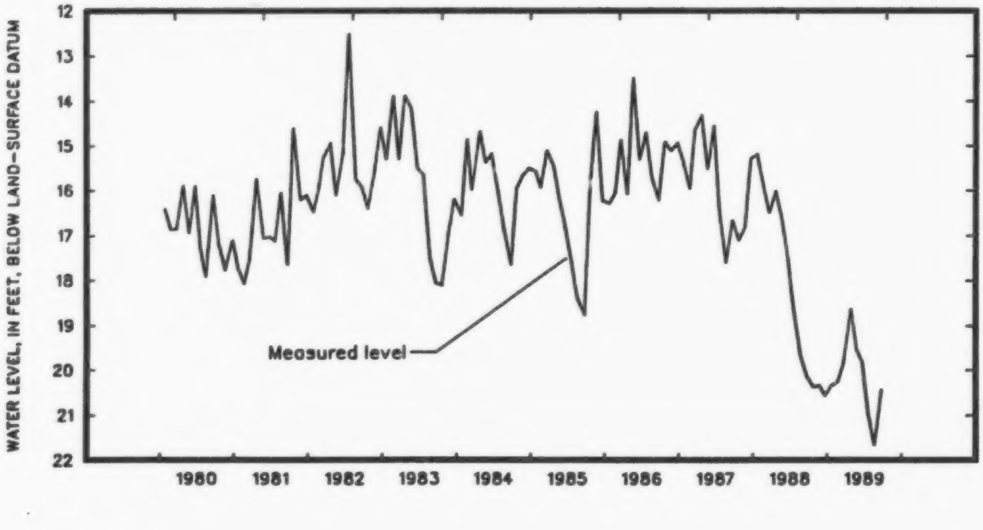
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	14.74	JAN 20	16.00	APR 27	17.20	JUL 21	16.93
NOV 23	15.29	FEB 22	16.49	MAY 26	16.92	AUG 21	17.02
DEC 22	15.67	MAR 23	16.91	JUN 23	16.85	SEP 25	16.93

414315091252002. Local number, 80-05-22 CBCB2.
LOCATION.--Lat 41°43'15", long 91°25'20", Hydrologic Unit 07080209, along the Chicago, Rock Island and Pacific Railroad track, southeast of the overpass on Rapid Creek Road over the track, approximately 5.5 mi northeast of the junction of Interstate 80 and Iowa Highway 1. Owner: Chicago, Rock Island and Pacific Railroad Co.
AQUIFER.--Devonian: in Cedar Valley limestone of Middle Devonian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 82 ft. Casing information not available.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 753 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 4.01 ft above land-surface datum.
REMARKS.--At the site of the former Elmira depot.
PERIOD OF RECORD.--December 1941 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.15 ft below land-surface datum, April 21, 1952; lowest measured, 21.65 ft below land-surface datum, August 21, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	20.37	JAN 20	20.34	APR 27	18.63	JUL 21	20.94
NOB 23	20.33	FEB 22	20.24	MAY 26	19.55	AUG 21	21.65
DEC 21	20.56	MAR 23	19.82	JUN 23	19.84	SEP 25	20.43

414315091252002



JOHNSON COUNTY

414149091331501. Local number, 80-06-33 BDBB.
LOCATION.--Lat 41°41'49", long 91°33'15", Hydrologic Unit 07080209, north of Iowa City approximately 0.5 mi and west of County Road W-66. Owner: River Products Quarry.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled industrial supply well, diameter 18 in., depth 150 ft, cased to 7 ft, open hole 7-150 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 670 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 44.00 ft below land-surface datum.
REMARKS.--Water levels affected by quarrying operations and by wells in the area pumping in late spring summer, and early fall.
PERIOD OF RECORD.--March 1971 to current year
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured (flowing), 44.00 ft below land-surface datum, December 28, 1979, January 3 and 10, 1980, February 8 and 22, 1980, March 10 and 21, 1980, April 4 and 21, 1980, March 25, 1981, April 15, 1981, December 21, 1981, January 21, 1982, February 19, 1982, March 18, 1982, April 20, 1982, December 27, 1982, January 27, 1983, February 28, 1983, March 28, 1983, April 28, 1983, December 27, 1983, January 30, 1984, March 1 and 29, 1984, April 30, 1984, November 29, 1984, December 27, 1984, January 31, 1985, February 26, 1985, March 19, 1985, April 18, 1985, December 6, 1985, January 6, 1986, February 6, 1986, March 6, 1986, April 6, 1986, and May 7, 1986; lowest measured, 92.54 ft below land-surface datum, July 30, 1975.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 01	70.66	FEB 02	69.57	MAY 05	70.96	AUG 02	86.97
DEC 02	63.69	MAR 06	70.60	JUN 02	77.52	SEP 05	79.29
JAN 11	69.00	APR 04	68.50	JUL 03	84.54		

414853091425101. Local number, 81-07-19 BCBB1.
LOCATION.--Lat 41°48'53", long 91°42'51", Hydrologic Unit 07080208, approximately 0.75 mi west and 2.25 mi south of the Town of Swisher. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 535 ft, cased to 130 ft, open hole 130-535 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.
REMARKS.--Plum Creek well. Water-level recorder removed September 30, 1989.
PERIOD OF RECORD.--November 1976 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 64.46 ft below land-surface datum, May 31, 1983; lowest recorded, 76.97 ft below land-surface datum, October 6, 1988.

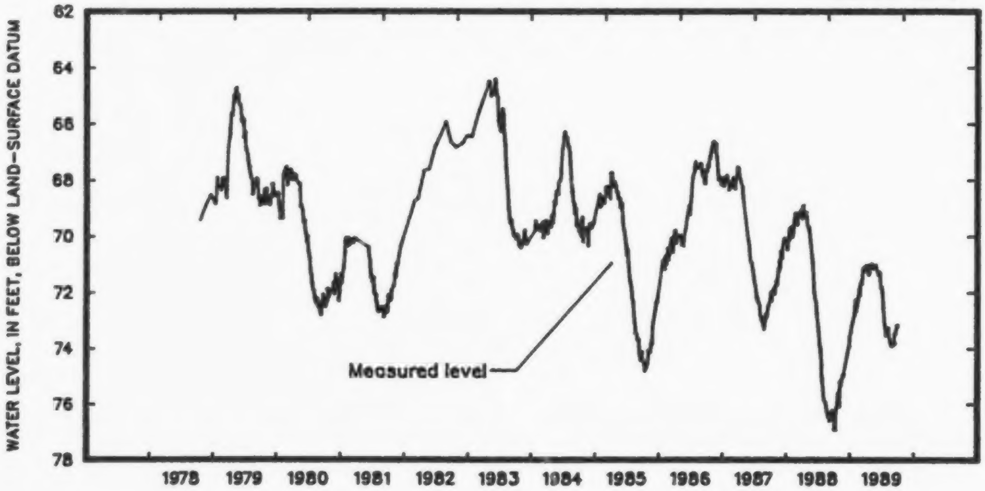
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
NOON VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	76.95	75.20	-----	73.43	72.69	71.64	71.09	71.09	71.32	72.07	a73.30	a73.85
10	76.37	75.33	-----	73.18	72.48	71.69	71.36	71.19	71.42	72.56	a73.56	73.50
15	76.12	75.14	-----	73.09	72.30	71.17	71.41	71.17	a71.30	73.09	-----	73.51
20	76.04	75.00	-----	72.92	72.12	71.31	71.34	71.13	71.35	73.31	-----	73.35
25	75.90	-----	73.96	72.83	72.12	71.12	71.05	-----	71.86	73.56	73.95	-----
EOM	76.13	-----	73.53	72.28	71.78	71.07	71.02	a71.20	71.83	a73.36	73.88	73.18

WTR YEAR 1989 HIGHEST 70.95 APRIL 29, 1989 LOWEST 76.97 OCT 6, 1988

a Recorded water level has been adjusted.

414853091425101



JOHNSON COUNTY

415052091483801. Local number, 81-08-05 CCCD1.

LOCATION.--Lat 41°50'52", long 91°48'38", Hydrologic Unit 07080208, approximately 7 mi west of the Town of Swisher, on the north side of County Road F-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 533 ft, cased to 135 ft, open hole 133-533 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 818 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.23 ft above land-surface datum.

REMARKS.--First Hole/Swisher.

PERIOD OF RECORD.--June 1972, March 1973, November 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 70.73 ft below land-surface datum, March 28, 1973; lowest measured, 90.38 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1971 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 06, 1972	73.18	JUL 18	75.01	MAY 28	81.34	MAY 02	79.57
MAR 28, 1973	70.73	AUG 16	79.00	JUL 18	82.53	AUG 21	81.91
NOV 13, 1975	78.79	SEP 12	79.65	SEP 17	82.30	NOV 26	81.27
DEC 09	78.43	OCT 12	79.52	NOV 18	82.18	MAR 21, 1986	80.73
JUL 12, 1976	77.68	NOV 09	79.42	FEB 03, 1981	80.96	JUN 18	80.14
FEB 18, 1977	81.45	DEC 07	79.40	MAR 18	79.98	AUG 25	79.53
JUN 14	83.28	APR 03, 1979	78.93	OCT 20	78.86	DEC 01	79.12
JUL 06	83.61	MAY 08	77.77	DEC 07	78.11	MAR 25, 1987	78.78
AUG 09	83.74	JUN 05	78.18	APR 22, 1982	80.88	JUN 09	80.97
SEP 08	83.10	JUL 09	78.44	SEP 27	78.90	AUG 10	82.71
OCT 21	81.69	AUG 08	78.78	MAR 17, 1983	77.84	OCT 13	82.04
NOV 04	81.70	SEP 13	78.81	AUG 24	79.88	MAR 10, 1988	81.24
DEC 16	80.48	OCT 09	79.48	OCT 05	79.70	JUN 07	83.61
JAN 11, 1978	80.72	NOV 06	80.09	APR 17, 1984	79.32	SEP 12	87.44
FEB 07	80.53	DEC 07	78.98	AUG 17	78.66	OCT 12	87.60
MAR 22	80.00	JAN 08, 1980	79.71	SEP 18	79.98	MAR 30, 1989	88.04
APR 25	79.93	FEB 04	79.70	NOV 08	79.76	JUN 14	87.30
MAY 30	79.20	MAR 15	78.51	MAR 05, 1985	79.15	SEP 11	90.38

JONES COUNTY

415808091160501. Local number, 83-04-25 CBBB1.

LOCATION.--Lat 41°58'08", long 91°16'05", Hydrologic Unit 07080103, 4 mi north of the Town of Mechanicsville and 1 mi west of County Road X-40. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Silurian: in dolomite of Silurian age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in. to 41 ft, 5 in. to 517 ft, depth 517 ft, cased to 41 ft, open hole 41 to 517 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 811 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.16 ft above land-surface datum.

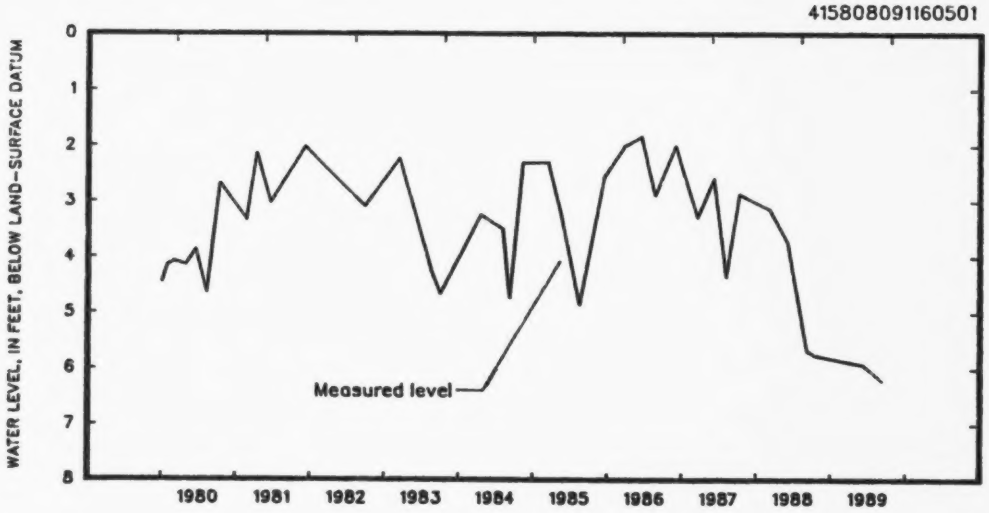
REMARKS.--White Oak Creek well.

PERIOD OF RECORD.--July 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.24 ft below land-surface datum, April 3, 1979; lowest measured, 6.21 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	5.76	MAR 30	5.88	JUN 13	5.93	SEP 11	6.21



LEE COUNTY

403630091240801. Local number, 67-05-14 BAAD1.
LOCATION.--Lat 40°36'30", long 91°24'08", Hydrologic Unit 07080104, approximately 1 mi east of U.S. Highway 61 and 0.5 mi north of the Atchison, Topeka, and Santa Fe railroad tracks, approximately 1.4 mi west and 1.1 mi south of the City of Fort Madison. Owner: U.S. Geological Survey.
AQUIFER.--Alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Driven observation water-table well, diameter 1.25 in., depth 12 ft, cased to 10 ft, sand point 10-12 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 530 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 3.55 ft above land-surface datum.
REMARKS.--Records for 1950 to 1981 and September 1985 are available in the files of the Iowa District Office. Well destroyed August, 1989.
PERIOD OF RECORD.--June 1950 to September 1981, September 1985 to July 1989.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.29 ft below land-surface datum, November 19, 1986; lowest measured, 9.70 ft below land-surface datum, January 29, 1953.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

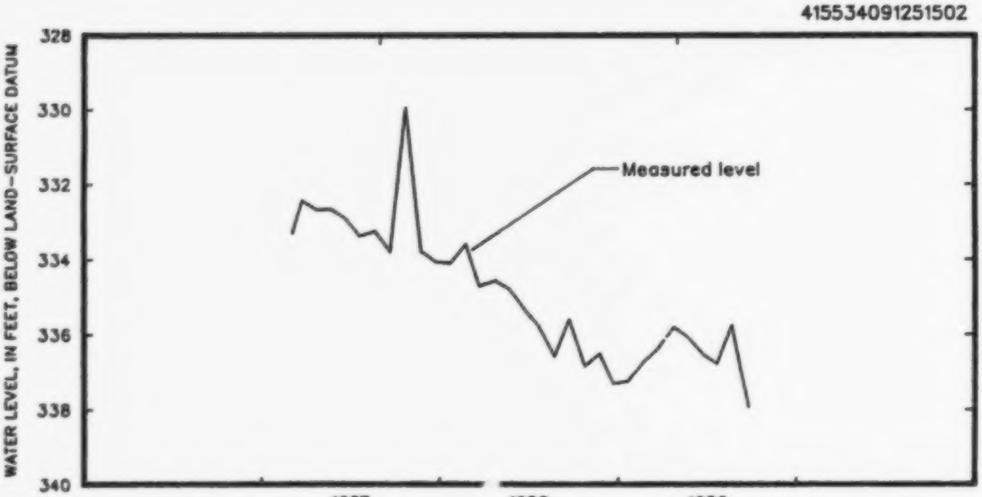
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 26	5.26	MAR 23	5.43	JUL 5	5.46

LINN COUNTY

415534091251502. Local number, 82-05-10 CBAA2.
LOCATION.--Lat 41°55'26", long 91°25'11", Hydrologic Unit 07080206, next to the water tower, north of Main Street, 3 blocks west of Iowa Highway 1 in Mt. Vernon. Owner: City of Mt. Vernon.
AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian age and sandstone and sandy dolomite of Early Ordovician age.
WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 12 to 8 in., depth 1,557 ft, cased to 1,054 ft, open hole 1,054-1,557 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 895 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.59 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--March 1987 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 329.96 ft below land-surface datum, October 22, 1987; lowest measured, 337.96 ft below land-surface datum, September 25, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	336.87	JAN 20	337.26	APR 24	335.83	JUL 21	336.81
NOV 23	336.53	FEB 22	336.74	MAY 26	336.15	AUG 21	335.78
DEC 21	337.33	MAR 23	336.39	JUN 23	336.56	SEP 25	337.96

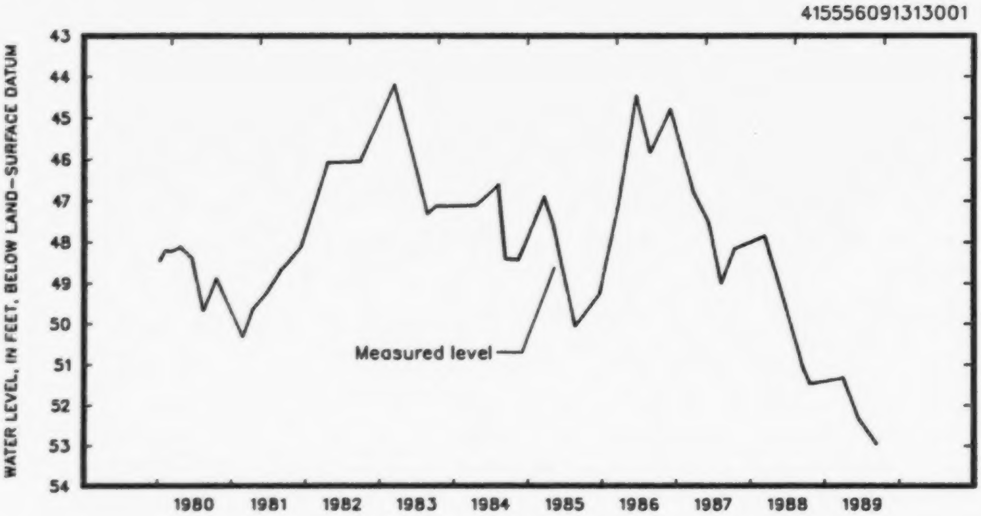


LINN COUNTY

415556091313001. Local number, 82-06-10 AABB1.
LOCATION.--Lat 41°55'56", long 91°16'41", Hydrologic Unit 07080206, approximately 1.25 mi south of the Town of Bertram, 1.5 mi east of Iowa Highway 13, and 0.5 mi north of U.S. Highway 30. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian: in limestone and dolomite of Silurian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 471 ft, cased to 126 ft, open hole 126-471 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 755 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.21 ft above land-surface datum.
REMARKS.--Bertram well.
PERIOD OF RECORD.--June 1976 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 44.18 ft below land-surface datum, March 16, 1983; lowest measured, 52.95 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1975 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 22, 1976	47.00	NOV 08	47.74	FEB 25, 1981	50.31	DEC 20	49.23
FEB 18, 1977	50.42	DEC 19	48.18	APR 16	49.62	MAR 20, 1986	47.14
JUN 14	51.09	APR 03, 1979	44.36	JUN 23	49.22	JUN 18	44.45
JUL 06	51.16	MAY 08	44.31	SEP 03	48.66	AUG 25	45.81
AUG 09	50.30	JUN 05	45.23	OCT 20	48.40	DEC 01	44.78
SEP 08	49.36	JUL 09	45.44	DEC 09	48.09	MAR 24, 1987	46.77
OCT 21	47.87	AUG 08	46.03	APR 21, 1982	46.05	JUN 09	47.52
27	47.63	SEP 14	45.50	SEP 27	46.02	AUG 10	48.98
NOV 23	47.33	OCT 10	46.76	MAR 16, 1983	44.18	OCT 13	48.14
JAN 24, 1978	47.52	NOV 05	46.93	AUG 24	47.30	MAR 10, 1988	47.83
FEB 28	48.54	DEC 04	47.10	OCT 05	47.10	JUN 07	49.33
MAR 24	47.88	JAN 09, 1980	48.44	APR 19, 1984	47.08	SEP 12	51.02
APR 22	46.69	FEB 06	48.19	AUG 07	46.59	OCT 19	51.46
MAY 31	46.34	MAR 07	48.22	SEP 11	48.39	MAR 30, 1989	51.30
JUL 17	45.67	APR 22	48.10	NOV 13	48.42	JUN 14	52.32
AUG 16	46.82	JUN 20	48.40	MAR 21, 1985	46.89	SEP 11	52.95
SEP 12	47.66	AUG 14	49.66	MAY 07	47.59		
OCT 11	47.59	OCT 17	48.87	AUG 21	50.04		



415442091343001. Local number, 82-06-17 CBAB1.
LOCATION.--Lat 41°54'42", long 91°34'30", Hydrologic Unit 07080206, approximately 2.5 mi north of the Town of Ely, on the north side of County Road W-8E. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 541 ft, cased to 64 ft, open hole 64-541 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 825 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.55 ft above land-surface datum.
REMARKS.--Ely North well. Records for April 1976 to September 1988 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--1976 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.67 ft below land-surface datum, May 8, 1979; lowest measured, 85.59 ft below land-surface datum, August 9, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	81.08	MAR 30	82.79	JUN 14	83.50	SEP 11	85.02

LINN COUNTY

415422091422601. Local number, 82-07-18 CDCD1.
LOCATION.--Lat 41°54'22", long 91°42'26", Hydrologic Unit 07080205, on 76th Avenue SW, approximately 1.5 mi west of U.S. Highway 218, Cedar Rapids. Owner: Lester Petrak.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Dug unused water-table well, diameter 4 ft, depth 13.5 ft, cribbed with brick.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 835 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Base of recorder shelter, 0.37 ft above land-surface datum.
REMARKS.--Water-level recorder removed October 1987.
PERIOD OF RECORD.--July 1959 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 1.09 ft below land-surface datum, August 4, 1968; lowest recorded, e11.75 ft below land-surface datum, February 8, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

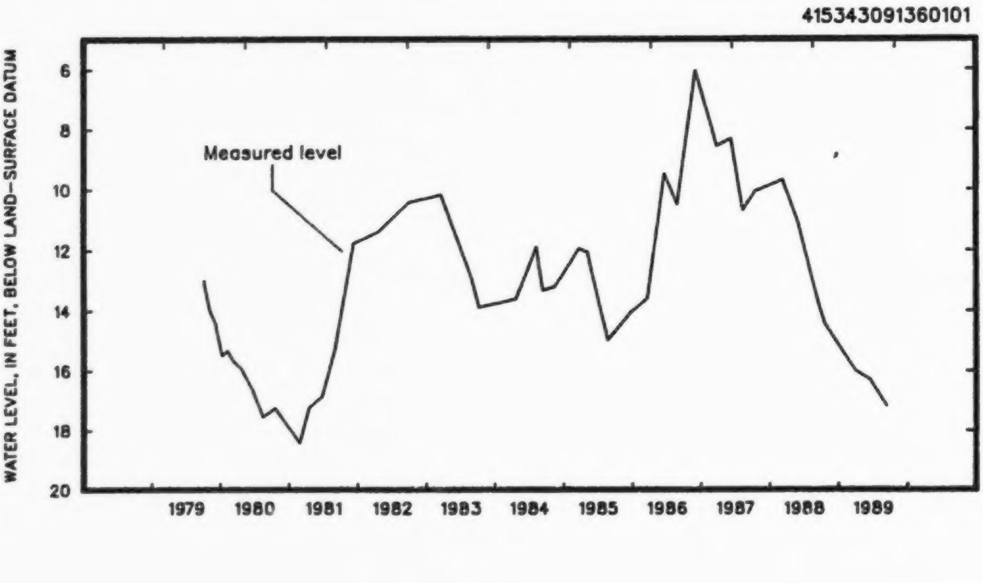
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	10.49	FEB 22	10.66	MAY 26	5.74	AUG 8	7.91
NOV 23	9.76	MAR 23	10.04	JUN 23	6.36	21	8.32
DEC 21	10.39	APR 24	6.62	JUL 21	7.37	SEP 25	6.06
JAN 20	10.19						

e Estimated.

415343091360101. Local number, 82-07-25 AAAB1.
LOCATION.--Lat 41°53'43", long 91°36'01", Hydrologic Unit 07080208, 0.5 mi northwest of the Town of Ely at the southwest corner of the junction of County Roads E-70 and W-6E. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian: in limestone and dolomite of Silurian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 401 ft, cased to 121.5 ft, open hole 121.5-401 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 772 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.76 ft above land-surface datum.
REMARKS.--Ely (Northwest) Railroad well. Records for May 1976 to September 1988 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--May 1976 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.08 ft below land-surface datum, Decem- 1, 1986; lowest measured, 19.96 ft below land-surface datum, July 6, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	14.46	MAR 30	16.03	JUN 14	16.32	SEP 11	17.21



LINN COUNTY

415509091461801. Local number, 82-08-20 ACBB1.
LOCATION.--Lat 41°55'09", long 91°46'18", Hydrologic Unit 070802005, approximately 1.5 mi southwest of the Town of Fairfax, just northwest of Iowa Highway 149. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 569 ft, cased to 100.5 ft, open hole 100.5-569 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 842 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 2.39 ft above land-surface datum.
REMARKS.--Rock Pile well.
PERIOD OF RECORD.--March 1973 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 95.70 ft below land-surface datum, June 21, 1974; lowest measured, 109.17 ft below land-surface datum, September 11, 1989.

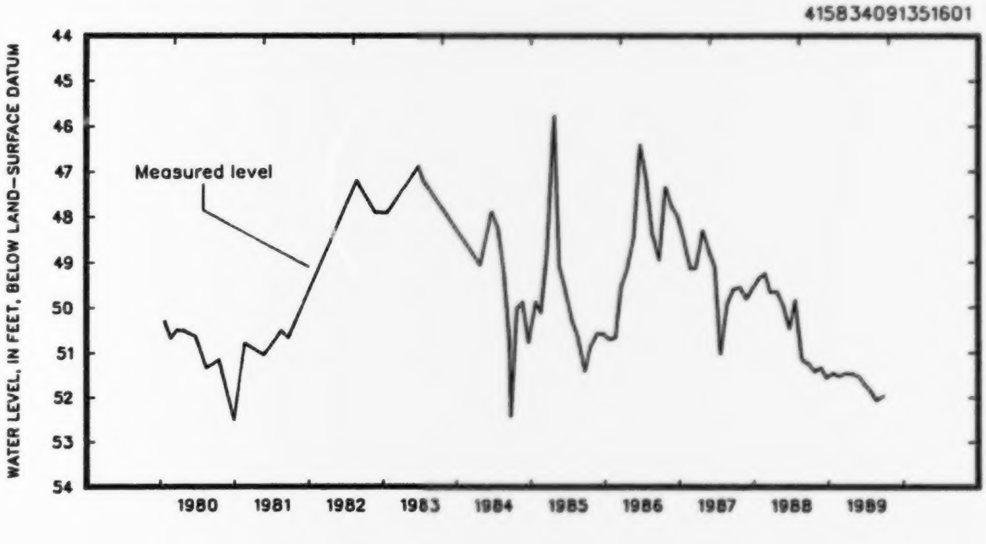
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 to SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	107.30	MAR 30	107.07	JUN 14	107.95	SEP 11	109.17

415834091351601. Local number, 83-06-30 ABBA1.
LOCATION.--Lat 41°58'34", long 91°35'16", Hydrologic Unit 07080206, approximately 200 ft west of 5201 Mount Vernon Road SE, Cedar Rapids. Owner: B.L. Anderson.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 76.5 ft. Casing information not available. Devonian rock reported to yield little, if any, water.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 755 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Hole in pump base, 0.50 ft above land-surface datum.
REMARKS.--Katz well. Records for 1940 to September 1985 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--May 1940 to current year.
EXTREMES OF PERIOD OF RECORD.--Highest water level measured, 41.93 ft below land-surface datum, April 25, 1973; lowest measured, 53.90 ft below land-surface datum, December 21, 1970.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	51.41	JAN 20	51.44	APR 24	51.46	JUL 21	51.83
NOV 23	51.32	FEB 22	51.52	MAY 26	51.52	AUG 21	52.05
DEC 21	51.55	MAR 23	51.44	JUN 23	51.69	SEP 25	51.95



LINN COUNTY

415816091393401. Local number, 83-07-28 ADDA1.

LOCATION.--Lat 41°58'16", long 91°39'34", Hydrologic Unit 07080205, 320 11th Avenue SE, Cedar Rapids. Owner: Robert Chadima.

AQUIFER.--Silurian: in limestone of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 10 in., depth 420 ft, cased to 75 ft, open hole 75-420 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 735 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder platform, 2.95 ft below land-surface datum.

REMARKS.--Formerly The Kacena Co., Inc. Water-level recorder removed October 1987.

PERIOD OF RECORD.--January 1962 to current year.

REVISED RECORDS.--WDR IA-84-1.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 51.10 ft below land-surface datum, February 25, 1963; lowest recorded, 101.40 ft below land-surface datum, July 27, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	92.90	JAN 20	85.53	APR 27	87.95	JUL 21	92.23
NOV 23	88.74	FEB 22	84.30	MAY 26	89.41	AUG 21	92.88
DEC 21	87.25	MAR 23	84.24	JUN 23	91.05	SEP 25	92.63

415725091410101. Local number, 83-07-32 ACDC1.

LOCATION.--Lat 41°57'25", long 91°41'01", Hydrologic Unit 07080205, northwest corner of 22nd Avenue SW and 11th Street SW, Cedar Rapids. Owner: Floyd Fetter.

AQUIFER.--Silurian: in limestone of Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 5 in., depth 282 ft. Casing information not available.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover at land-surface datum.

REMARKS.--Water levels may be affected by pumping of near by wells.

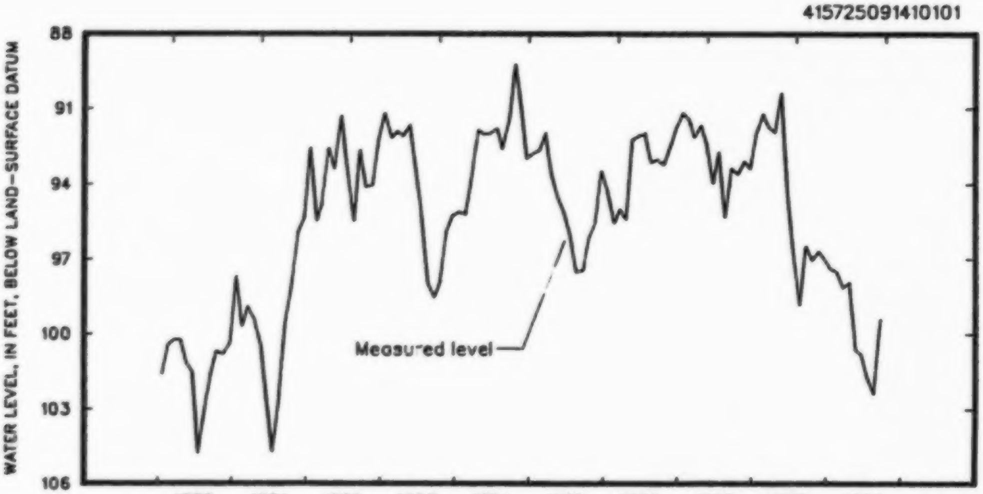
PERIOD OF RECORD.--July 1940 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 75.88 ft below land-surface datum, January 26, 1942; lowest measured, 107.00 ft below land-surface datum, September 16, 1976.

REVISION.--Highest water level measured, 75.88 ft below land-surface datum, January 26, 1942.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 24	97.05	JAN 20	97.38	APR 24	97.93	JUL 21	101.74
NOV 23	96.69	FEB 22	97.53	MAY 26	100.64	AUG 21	102.36
DEC 21	96.99	MAR 23	98.15	JUN 23	100.82	SEP 25	99.41

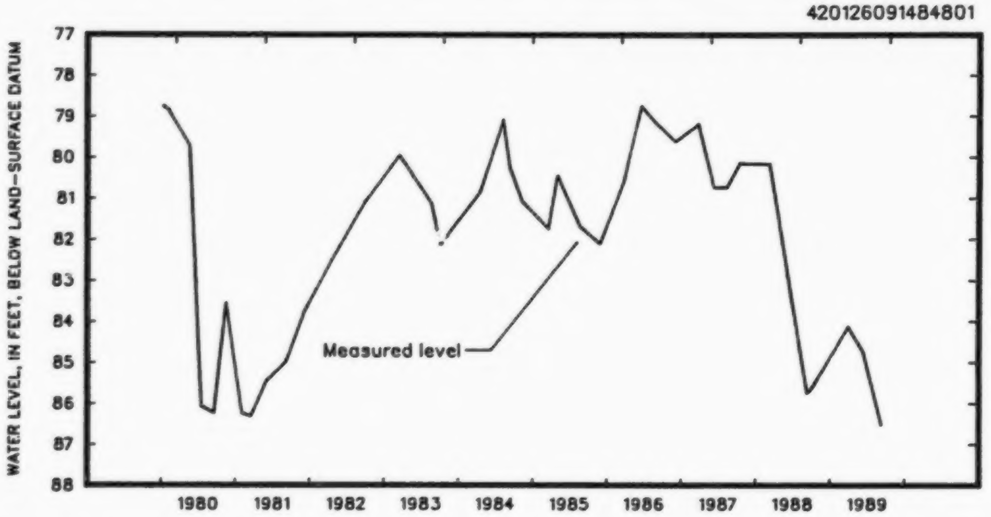


LINN COUNTY

420126091484801. Local number, 83-08-06-DDAD1.
LOCATION.--Lat 42°01'26", long 91°48'48", Hydrologic Unit 07080205, approximately 2.5 mi southwest of the Town of Palo, south of County Road E-40 near the former site of the Lincoln Church. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 561 ft, cased to 83 ft, open hole 83-561 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 842 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.97 ft above land-surface datum.
REMARKS.--Lincoln Church well. Records for October 1972 to September 1988 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--October 1972 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 61.72 ft below land-surface datum, June 9, 1974; lowest measured, 88.27 ft below land-surface datum, January 31, 1976.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	85.55	MAR 30	84.11	JUN 14	84.75	SEP 11	86.52



420300091325801. Local number, 84-06-33 ABBB1.
LOCATION.--Lat 42°03'00", long 91°32'58", Hydrologic Unit 07080206, near the City of Marion on the east side of Iowa Highway 13, approximately 1 mi north of U.S. Highway 151. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian: in dolomite of Silurian age.
WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 6 in., depth 481 ft, cased to 142 ft, open hole 142-481 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 838 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.90 ft above land-surface datum.
REMARKS.--Marion well.
PERIOD OF RECORD.--June 1976 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 42.15 ft below land-surface datum, June 18, 1986; lowest measured, 50.19 ft below land-surface datum, July 6, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1975 TO SEPTEMBER 1989

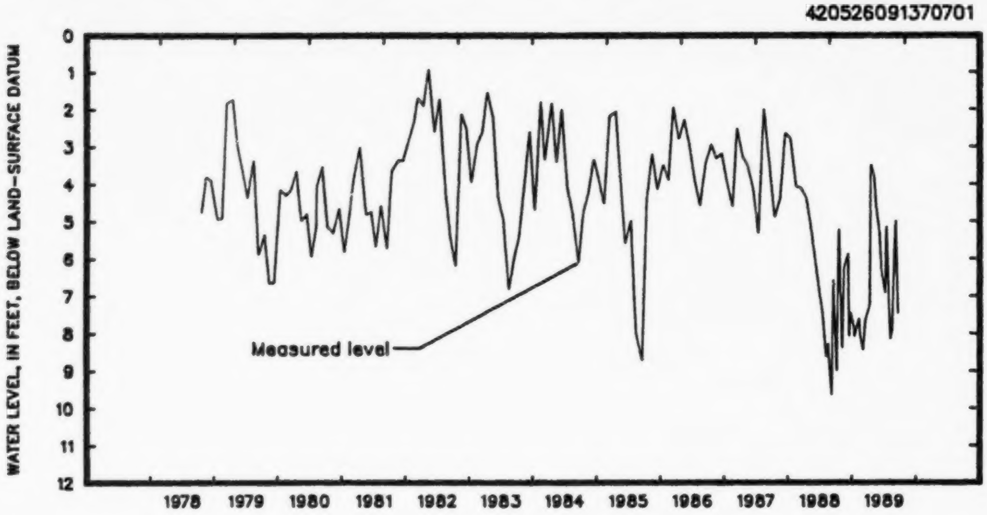
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 22, 1976	44.00	NOV 18	46.63	FEB 25, 1981	47.86	DEC 20	46.73
FEB 18, 1977	49.27	DEC 06	46.81	APR 16	46.69	MAR 21, 1986	45.90
JUN 14	49.79	APR 03, 1979	44.29	JUN 23	46.67	JUN 18	42.15
JUL 06	50.19	MAY 08	44.10	SEP 03	45.36	AUG 25	45.35
AUG 09	49.42	JUN 05	45.56	OCT 20	44.51	DEC 01	44.62
SEP 08	47.85	JUL 09	45.98	DEC 09	45.02	MAR 20, 1987	46.23
OCT 21	45.89	AUG 08	46.48	APR 21,1982	44.56	JUN 09	46.40
OCT 27	44.56	SEP 13	46.53	SEP 27	45.28	AUG 10	47.40
NOV 23	45.27	OCT 10	46.93	MAR 17,1983	44.87	OCT 13	45.30
JAN 24, 1978	45.56	NOV 06	47.22	AUG 24	47.24	MAR 10, 1988	45.69
FEB 28	46.67	DEC 03	47.28	OCT 05	47.04	JUN 07	47.69
MAR 24	46.27	JAN 09, 1980	48.02	APR 19,1984	45.83	SEP 12	48.92
APR 22	45.02	FEB 06	46.55	AUG 07	45.60	OCT 19	49.19
MAY 31	45.03	MAR 07	47.56	SEP 13	46.89	MAR 30, 1989	49.20
JUL 17	46.14	APR 22	47.41	NOV 13	46.25	JUN 14	49.32
AUG 16	46.20	JUN 20	47.84	MAR 21,1985	45.84	SEP 11	49.97
SEP 12	47.31	AUG 14	48.68	MAY 07	46.04		
OCT 11	46.76	OCT 17	47.66	AUG 21	48.08		

LINN COUNTY

420526091370701. Local number, 84-07-13 BCBB1.
LOCATION.--Lat 42°05'26", long 91°37'07", Hydrologic Unit 07080206, approximately 0.25 mi south of the junction of County Roads W-58 and E-34, on the east side of the road, or approximately 3.75 mi north of the City of Marion. Owner: U.S. Geological Survey.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 1.25 in., depth 17 ft, cased to 15 ft, screened 15-17 ft.
METHOD.--Twice a month measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 882 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 1.24 ft above land-surface datum.
REMARKS.--USGS13E2 well.
PERIOD OF RECORD.--September 1948 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.93 ft below land-surface datum, May 18, 1982; lowest measured, 15.19 ft below land-surface datum, January 20, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 10	9.00	JAN 17	7.85	APR 17	7.22	JUL 15	6.92
24	5.23	20	8.09	24	3.50	21	5.16
NOV 11	8.39	FEB 14	7.62	MAY 12	3.83	AUG 12	8.15
23	6.22	22	8.06	25	4.65	21	7.94
DEC 15	5.88	MAR 10	8.44	JUN 13	5.35	SEP 12	4.99
21	8.08	23	7.63	23	6.32	25	7.47
29	7.47						



420508091395811. Local number, 84-07-16 DBBB1.
LOCATION.--Lat 42°05'16", long 91°40'02", Hydrologic Unit 07080205, approximately 0.5 mi south of County Road E-34, north of the Town of Robins. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian: in dolomite of Silurian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 520 ft, cased to 173 ft, open hole 173-520 ft, 18 ft of Devonian rock open.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 873 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.20 ft above land-surface datum.
REMARKS.--Robins well. Records for April 1975 to September 1988 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--April 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 36.74 ft below land-surface datum, April 11, 1979; lowest measured, 55.27 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

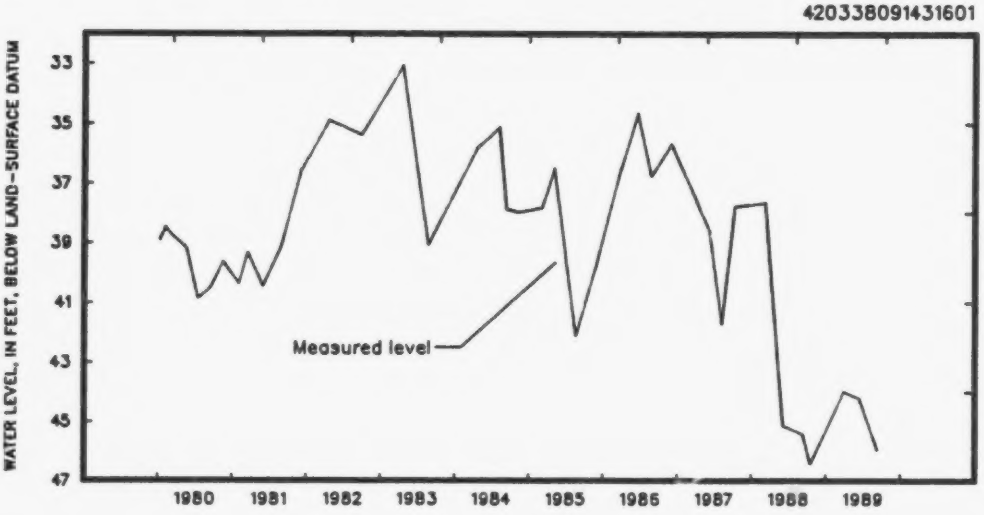
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	52.06	MAR 30	52.57	JUN 14	51.13	SEP 11	55.27

LINN COUNTY

420338091431601. Local number, 84-08-25 ACAD1.
LOCATION.--Lat 42°03'38", long 91°43'16", Hydrologic Unit 07080205, approximately 1.5 mi northwest of the Town of Hiawatha near the Morrison Cemetery and the KCRG-TV Radio Tower. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian: in dolomite Silurian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 468 ft, cased to 153 ft, open hole 153-468 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.38 ft above land-surface datum.
REMARKS.--Hiawatha well. Records for October 1973 to September 1988 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--October 1973 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.82 ft below land-surface datum, July 7, 1974; lowest measured, 46.41 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19	46.41	MAR 30	43.97	JUN 14	44.22	SEP 11	45.95



420320091472201. Local number, 84-08-28 CBDD1.
LOCATION.--Lat 42°03'20", long 91°47'22", Hydrologic Unit 07080205, 0.5 mi southeast of the Town of Palo, 0.25 mi east of Iowa Highway 94. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian: in dolomite of Silurian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 442 ft, cased to 148 ft, open hole 148-442 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 743 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.08 ft above land-surface datum.
REMARKS.--Palo well. Records for April 1976 to September 1988 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--April 1976 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.64 ft below land-surface datum, April 5, 1979; lowest measured, 13.26 ft below land-surface datum, July 17, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

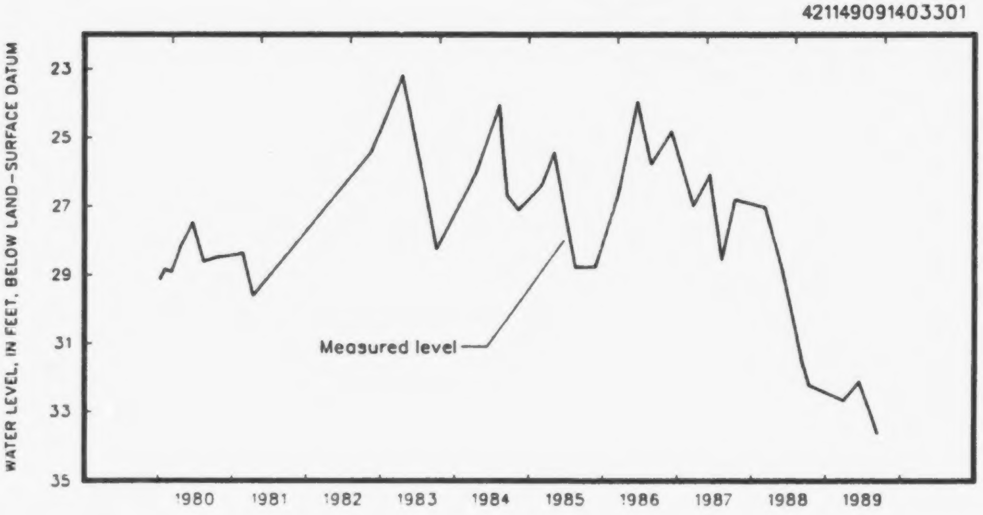
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	12.60	MAR 30	11.93	JUN 14	11.96	SEP 11	12.76

LINN COUNTY

421149091403301. Local number, 85-07-04 CCCC1.
LOCATION.--Lat 42°11'49", long 91°40'33", Hydrologic Unit 07080205, approximately 5 mi east of the Town Town of Center Point, north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 6 in., depth 435 ft, cased to 41 ft, 5 in. liner 129-147 ft, open hole 41-129 ft and 147-435 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 912 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.21 ft above land-surface datum.
REMARKS.--Alice well.
PERIOD OF RECORD.--July 1973 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.06 ft below land-surface datum, June 10, 1974; lowest measured, 33.61 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	32.22	MAR 30	32.66	JUN 14	32.11	SEP 11	33.61



420954091480801. Local number, 85-08-20 ABCD1.
LOCATION.--Lat 42°09'54", long 91°48'08", Hydrologic Unit 07080205, approximately 1.5 mi south of the Town of Center Point near the Lewis Bottoms Access County Park on the south side of County Road W-36. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian-Devonian: in dolomite of Silurian age and limestone and dolomite of Devonian age.
WELL CHARACTERISTICS.--Drilled observation artesian well, diameter 5 and 4 in., depth 433 ft, cased to 39.5 ft and a liner 147.7-177 ft, open hole 39.5-147.7 ft, and 177-437 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 805 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.84 ft above land-surface datum.
REMARKS.--Center Point Bridge well. Records for March 1974 to September 1988 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--March 1974 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.50 ft below land-surface datum, June 14 and 15, 1974; lowest measured, 34.58 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	32.89	MAR 30	32.74	JUN 14	33.08	SEP 11	34.58

LINN COUNTY

420730091490401. Local number, 85-08-31 DDCD1.
LOCATION.--Lat 42°07'30", long 91°49'04", Hydrologic Unit 07080205, at the fenced north end of Pleasant Creek Reservoir near the beach house in the beach area. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Silurian: in dolomite of Silurian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 481 ft, cased to 214 ft, open hole 214-481 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 833 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.17 ft above land-surface datum.
REMARKS.--Pleasant Creek Reservoir/Silurian well. Records for May 1975 to September 1988 are available in the files of the Iowa District Office.
PERIOD OF RECORD.--May 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 84.17 ft below land-surface datum, April 5, 1976; lowest measured, 105.90 ft below land-surface datum, September 11, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

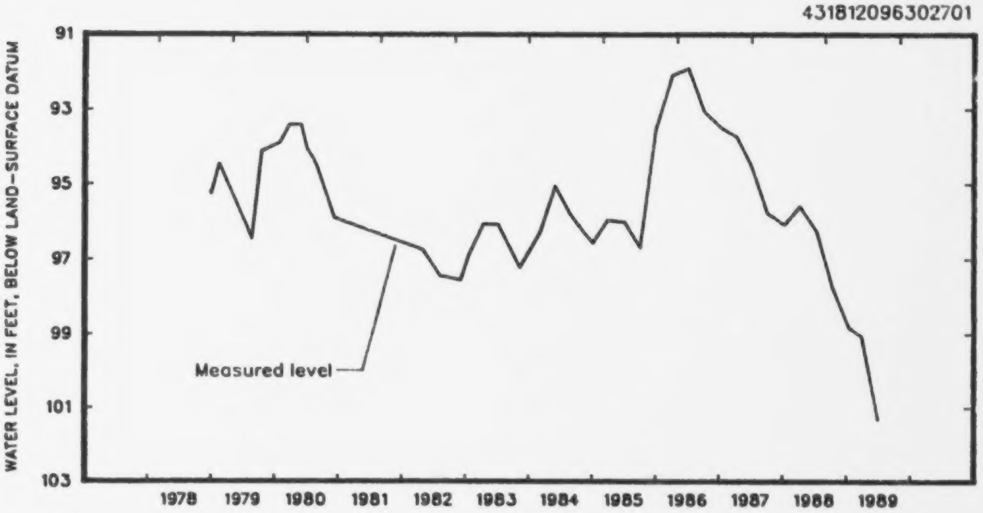
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	101.45	MAR 30	100.97	JUN 14	104.70	SEP 11	105.90

LYON COUNTY

431812096302701. Local number, 98-48-16 DDAD1.
LOCATION.--Lat 43°18'12", long 96°30'27", Hydrologic Unit 10170203, approximately 3.5 mi east of the City of Canton, S.D., south of U.S. Highway 18. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 358 ft, cased to 358 ft, perforated 335-355 ft. Open to Late Precambrian Sioux quartzite from 353-358 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,268 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.00 ft above land-surface datum.
REMARKS.--Well D-20.
PERIOD OF RECORD.--December 1978 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 91.89 ft below land-surface datum, July 8, 1986; lowest measured, 101.30 ft below land-surface datum, July 6, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	97.75	JAN 19	98.82	APR 04	99.06	JUL 06	101.30

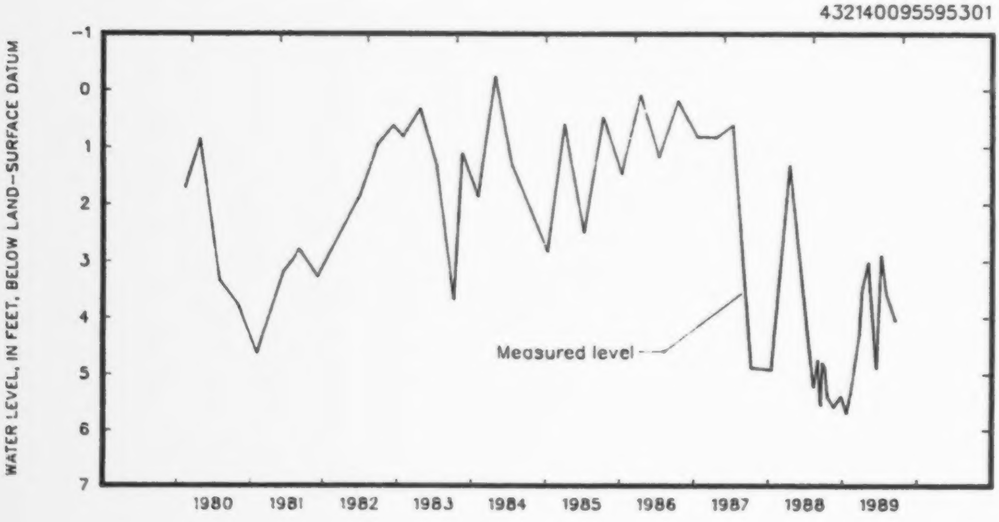


LYON COUNTY

432140095595301. Local number, 99-44-26 DDDD1.
LOCATION.--Lat 43°21'40", long 95°59'53", Hydrologic Unit 10170204, 1 mi north of the City of George, west of Iowa Highway 339. Owner: State of Iowa.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 20 in., depth 38 ft, lined with tile.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,400 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover, 2.01 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--October 1940 to June 1943, May 1947 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.41 ft above land-surface datum, May 9, 1979; lowest measured, 9.74 ft below land-surface datum, October 24, 1940.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	4.88	JAN 19	5.68	APR 04	3.52	JUL 06	2.90
18	5.41	FEB 08	5.32	MAY 03	3.03	AUG 02	3.61
NOV 16	5.58	MAR 22	4.29	JUN 14	4.89	SEP 13	4.05
DEC 21	5.37						



432553096105701. Local number, 99-45-05 ABAC1.
LOCATION.--Lat 43°25'53", long 96°10'55", Hydrologic Unit 10170204, 0.05 mi south of Iowa Highway 9 on 2nd Street, Rock Rapids. Owner: City of Rock Rapids.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 10 in., depth 375 ft, cased to 296 ft, open hole 296-375 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,368 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in cover over casing, 1.00 ft above land-surface datum.
REMARKS.--City test well No. 3.
PERIOD OF RECORD.--August 1960 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 100.08 ft below land-surface datum, July 27, 1964; lowest measured, 114.68 ft below land-surface datum, September 12, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

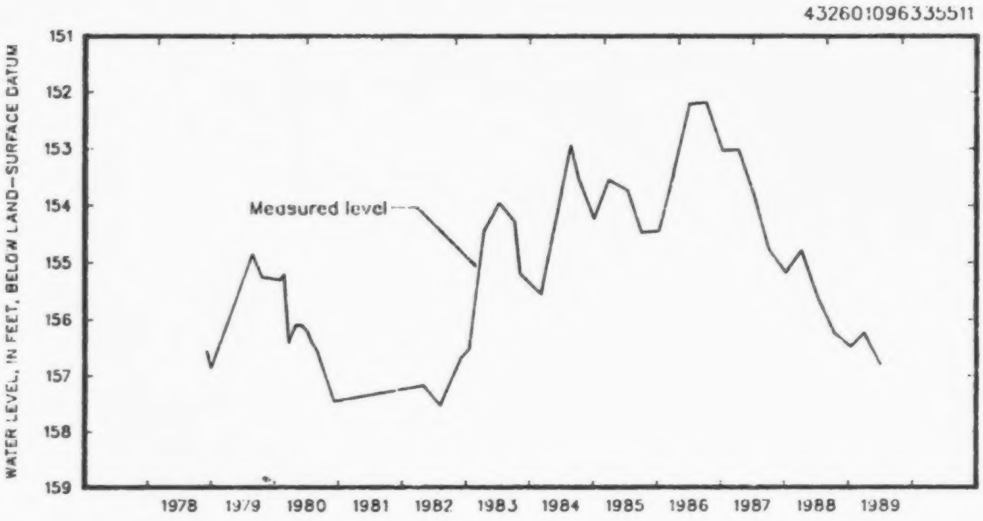
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 04	114.07	FEB 08	114.42	MAY 03	114.23	AUG 03	114.44
NOV 16	113.79	MAR 22	114.06	JUN 13	114.30	SEP 12	114.68
DEC 21	114.08						

LYON COUNTY

432601096335511. Local number, 100-48-31 CCCC11.
LOCATION.--Lat 43°26'01", long 96°33'55", Hydrologic Unit 10170203, 0.5 mi west and 2.5 mi south of the Village of Granite. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 657 ft, cased to 657 ft, perforated 450-455 ft and 630-650 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,417 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.
REMARKS.--Well D-19.
PERIOD OF RECORD.--December 1978 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 152.17 ft below land-surface datum, October 9, 1986; lowest measured, 157.53 ft below land-surface datum, August 12, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	156.24	JAN 19	156.48	APR 04	156.23	JUL 06	156.80



MADISON COUNTY

411727093483001. Local number, 75-26-23 AAAC1.
LOCATION.--Lat 41°17'27", long 93°48'30", Hydrologic Unit 07100008, near the shelter house in the city park, St. Charles. Owner: City of St. Charles.
AQUIFER.--Mississippian: in limestone of Mississippian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 867 ft, cased to 657 ft, open hole 657-867 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,067 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Plug in well cover, 1.20 ft above land-surface datum.
REMARKS.--City well No. 1.
PERIOD OF RECORD.--November 1962 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 261.62 ft below land-surface datum, November 20, 1962; lowest measured, 275.80 ft below land-surface datum, March 31, 1987.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

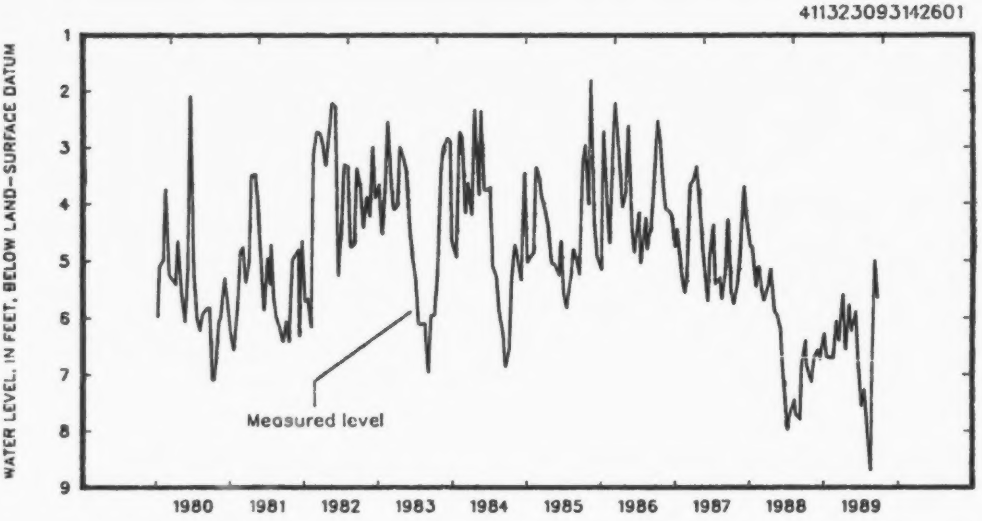
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	274.27	MAR 22	274.63	JUL 27	274.81

MARION COUNTY

411323093142601. Local number, 74-21-11 DBCC1.
LOCATION.--Lat 41°13'23", long 93°14'26", Hydrologic Unit 07100008, north of the water tower in the town square, Melcher. Owner: Town of Melcher.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 18 in., depth 12.2 ft, lined with tile. Depth originally 25 ft, re-measured in 1981.
METHOD.--Twice a month measurement with chalked tape by observer.
DATUM.--Elevation of land-surface datum is 948 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of tile casing at land-surface datum.
REMARKS.--Town well No. 2.
PERIOD OF RECORD.--March 1950 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.30 ft below land-surface datum, May 23, 1966; lowest measured, 16.27 ft below land-surface datum, October 22, 1953.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	6.40	JAN 23	6.69	APR 24	6.51	JUL 11	7.55
17	6.84	FEB 10	6.71	25	6.55	24	7.26
NOV 09	7.12	24	6.70	MAY 09	5.77	AUG 10	8.07
23	6.70	MAR 10	6.06	22	6.23	23	8.68
DEC 10	6.57	23	6.40	JUN 12	5.89	SEP 11	5.00
22	6.72	APR 10	5.59	23	6.59	25	5.65
JAN 10	6.28						



411329093142902. Local number, 74-21-11 DBBB2.
LOCATION.--Lat 41°13'29", long 93°14'29", Hydrologic Unit 07100008, southeast corner of the T junction of North B Street and Main Street, Melcher. Owner: Town of Melcher.
AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 6 in., depth 119 ft, cased to 76 ft, open hole 76-119 ft. Sand and gravel 103-117 ft. Pennsylvanian shale 117-119 ft.
METHOD.--Twice a month measurement with chalked tape by observer.
DATUM.--Elevation of land-surface datum is 943 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to plate on top of casing, 1.82 ft above land-surface datum.
REMARKS.--Town well No. 3, well 11K1.
PERIOD OF RECORD.--July 1945 to December 1955, October 1976 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.43 ft below land-surface datum, May 21, 1986; lowest measured (nearby well pumping), 108.85 ft below land-surface datum, December 4, 6-7, 1949.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	22.14	JAN 23	22.28	APR 24	22.19	JUL 11	21.98
17	22.16	FEB 10	22.25	25	22.20	24	22.18
NOV 09	22.37	24	22.28	MAY 09	20.58	AUG 10	22.44
23	22.26	MAR 10	21.91	22	21.18	23	22.52
DEC 10	22.23	23	22.03	JUN 12	20.33	SEP 11	19.88
22	22.26	APR 10	22.23	23	21.43	25	20.43
JAN 10	22.03						

MARION COUNTY

411328093143503. Local number, 74-21-11 CAAD3.

LOCATION.--Lat 41°13'28", long 93°14'35", Hydrologic Unit 07100008, northeast corner of the junction of West 1st Street and North A Street, Melcher. Owner: Town of Melcher.

AQUIFER.--Glacial drift: in sand of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 1.25 in., depth 96.5 ft, cased to 80 ft, screened 80-82 ft, open hole 82-96.5 ft.

METHOD.--Twice a month measurement with chalked tape by observer.

DATUM.--Elevation of land-surface datum is 944 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to casing, 0.51 ft above land-surface datum.

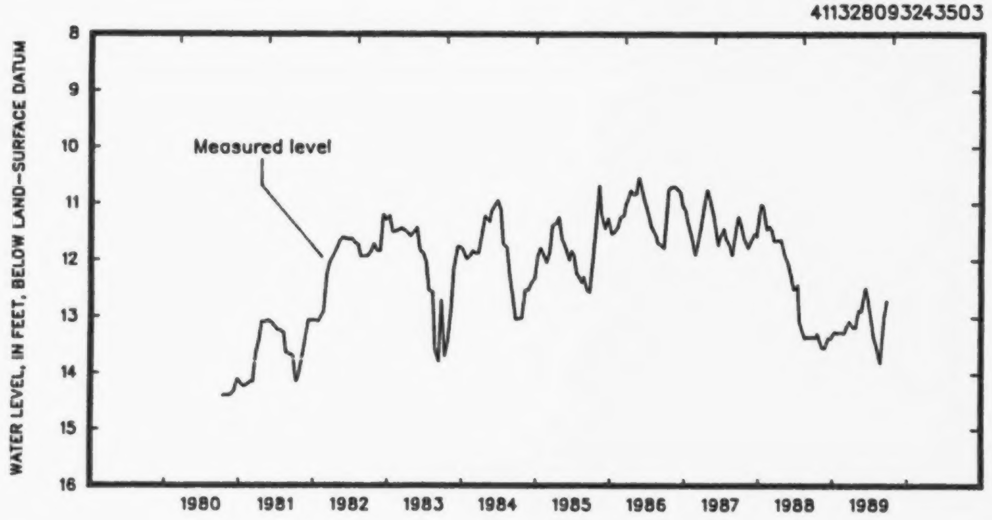
REMARKS.--Town well No. 5, well 11L1.

PERIOD OF RECORD.--January 1956 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.55 ft below land-surface datum, May 21, 1986; lowest measured (nearby well pumping), 55.22 ft below land-surface datum, January 26, 1956.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 11	13.35	JAN 23	13.28	APR 24	13.19	JUL 11	13.09
17	13.29	FEB 10	13.28	25	13.14	24	13.3
NOV 09	13.54	24	13.29	MAY 09	12.88	AUG 10	13.61
23	13.54	MAR 10	13.17	22	12.89	23	13.81
DEC 10	13.37	23	13.08	JUN 12	12.49	SEP 11	13.02
22	13.37	APR 10	13.18	23	12.69	25	12.71
JAN 10	13.26						



MARSHALL COUNTY

420355092534701. Local number, 84-18-24 CDCA1.

LOCATION.--Lat 42°03'55", long 92°53'47", Hydrologic Unit 07080208, east of Riverview Park and south of the sewage treatment plant, Marshalltown. Owner: City of Marshalltown.

AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 200 ft, cased to 190 ft, screened 190-200 ft.

METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 871 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.

REMARKS.--None.

PERIOD OF RECORD.--May 1949 to August 1971, March 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.92 ft below land-surface datum, July 13, 1951; lowest measured, 54.95 ft below land-surface datum, May 8, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

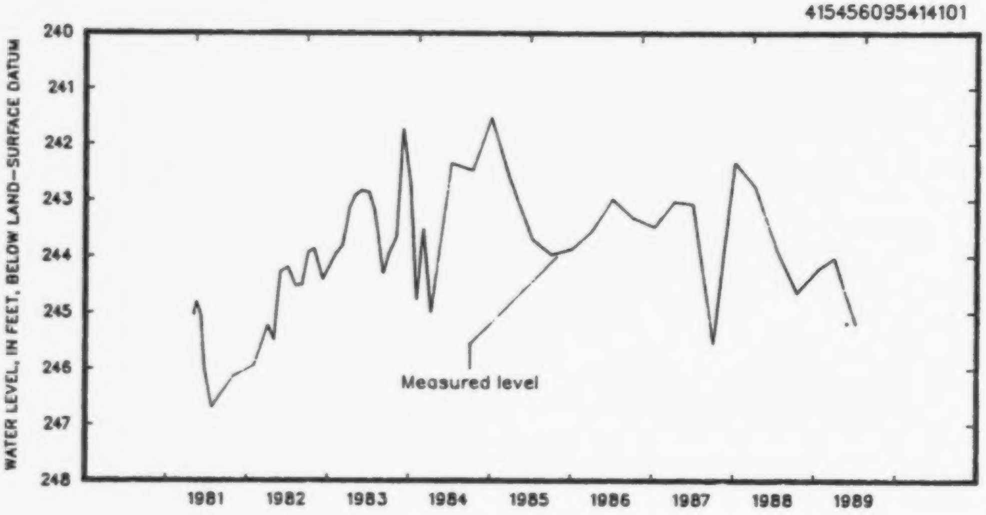
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 14	42.56	JUL 06	42.35	SEP 06	29.18	SEP 14	40.02
MAR 20	32.39						

MONONA COUNTY

415456095414101. Local number, 82-42-14 ADCA1.
LOCATION.--Lat 41°54'56", long 95°41'41", Hydrologic Unit 10230007, approximately 6 mi southeast of the Town of Soldier, on the north side of Iowa Highway 37. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 341 ft, cased to 336 ft, slotted 311-336 ft, gravel-packed.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,340 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.02 ft above land-surface datum.
REMARKS.--Well WC-4.
PERIOD OF RECORD.--May 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 240.25 ft below land-surface datum, January 10, 1984; lowest measured, 246.69 ft below land-surface datum, July 28, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 06, 1981	245.04	NOV 01	243.86	JAN 10, 1984	240.25	JAN 12, 1987	243.47
19	244.81	DEC 10	244.40	FEB 06	244.76	APR 13	243.01
JUN 10	245.07	JAN 03, 1983	244.21	MAR 07	243.51	JUL 06	243.07
26	246.00	FEB 08	243.94	APR 11	244.98	OCT 07	245.53
JUL 28	246.69	MAR 10	243.79	JUL 11	242.34	JAN 11, 1988	242.32
NOV 03	246.13	APR 12	243.10	OCT 15	242.47	APR 11	242.76
FEB 05, 1982	245.93	MAY 03	242.91	JAN 07, 1985	241.52	JUL 18	243.87
APR 07	245.22	JUN 02	242.82	APR 01	242.63	OCT 17	244.64
MAY 06	245.48	JUL 05	242.86	JUL 11	243.69	JAN 19, 1989	244.22
JUN 03	244.27	AUG 02	243.20	OCT 07	243.97	APR 03	244.02
JUL 06	244.19	SEP 08	244.29	JAN 06, 1986	243.86	JUL 07	245.19
AUG 11	244.52	OCT 04	243.94	APR 07	243.53		
SEP 09	244.49	NOV 08	243.63	JUL 07	242.97		
OCT 07	243.91	DEC 08	241.73	OCT 08	243.31		



420004095451501. Local number, 83-42-17 ACDD1.
LOCATION.--Lat 42°00'04", long 95°45'15", Hydrologic Unit 10230001, approximately 1.75 mi northeast of the Town of Soldier, 0.25 mi west of Iowa Highway 183. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 161 ft, cased to 161 ft, slotted 149-154 ft. Open to 8 ft of Pennsylvanian shale and limestone, 153-161 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,160 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.
REMARKS.--Well WC-176.
PERIOD OF RECORD.--May 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 55.17 ft below land-surface datum, January 7, 1985; lowest measured, 64.09 ft below land-surface datum, September 7, 1983.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 19, 1983	60.42	FEB 06	60.35	JAN 06, 1986	60.35	APR 11	59.78
JUN 02	60.35	MAR 07	59.96	APR 06	60.70	JUL 18	63.40
JUL 05	60.92	APR 10	59.95	JUL 07	60.37	OCT 17	62.50
AUG 02	61.96	JUL 11	60.28	OCT 08	60.04	JAN 19, 1989	61.42
SEP 07	64.09	OCT 15	60.09	JAN 12, 1987	59.39	APR 03	61.36
OCT 04	62.10	JAN 07, 1985	55.17	APR 13	59.57	JUL 07	63.64
NOV 07	61.25	APR 01	59.95	JUL 06	61.21		
DEC 08	60.43	JUL 10	61.67	OCT 07	60.27		
JAN 10, 1984	60.53	OCT 07	61.78	JAN 11, 1988	59.17		

MONONA COUNTY

420139095155701. Local number, 83-43-04 CBCB1.
LOCATION.--Lat 42°01'39", long 95°15'57", Hydrologic Unit 10230005, approximately 5.5 mi northwest of the Town of Soldier and 1.5 mi north of Iowa Highway 37. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 321 ft, cased to 315 ft, slotted 297-315 ft, gravel-packed, open hole 315-321 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,235 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.53 ft above land-surface datum.
REMARKS.--Well WC-5.
PERIOD OF RECORD.--May 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 184.67 ft below land-surface datum, October 15, 1984; lowest measured, 189.96 ft below land-surface datum, February 2, 1982.

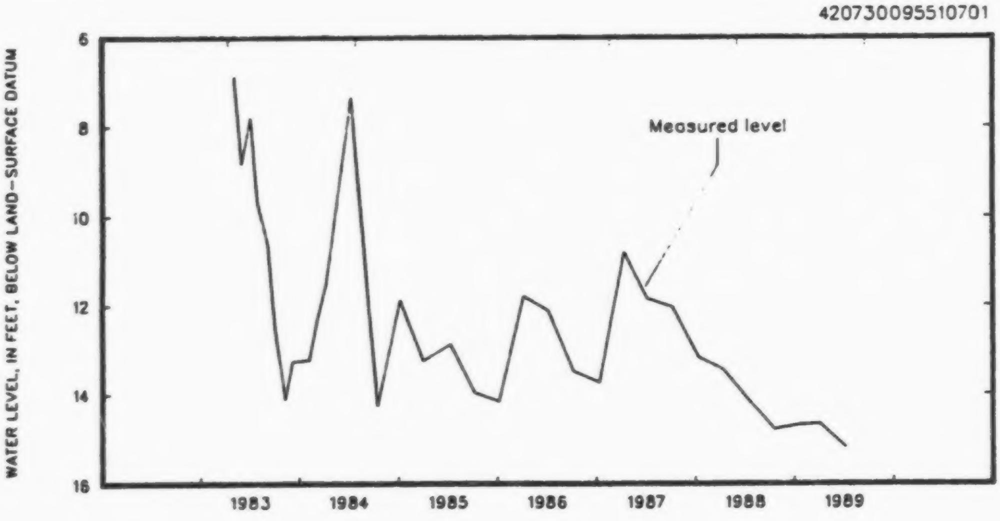
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 06, 1981	189.01	OCT 07	188.27	NOV 09	185.91	APR 13	185.31
MAY 19	188.92	NOV 01	187.22	MAY 15, 1984	185.91	JUL 06	185.21
JUN 10	187.55	DEC 10	187.75	JUL 11	185.09	OCT 07	185.02
25	188.59	JAN 03, 1983	187.70	OCT 15	184.67	JAN 11, 1988	184.86
JUL 28	189.59	FEB 08	187.33	JAN 07, 1985	185.15	APR 11	185.56
NOV 02	189.88	MAR 10	187.28	APR 01	185.27	JUL 18	185.91
FEB 02, 1982	189.96	APR 12	187.16	JUL 10	186.60	OCT 17	186.59
APR 07	189.00	MAY 02	186.07	OCT 07	185.82	JAN 19, 1989	186.83
MAY 06	188.99	JUN 02	185.90	JAN 06, 1986	186.01	APR 03	186.42
JUN 09	188.73	JUL 05	186.20	APR 07	185.48	JUL 07	187.24
JUL 06	188.27	AUG 01	186.39	JUL 07	185.27		
AUG 04	187.65	SEP 08	186.99	OCT 08	185.52		
SEP 09	187.75	OCT 04	186.66	JAN 12, 1987	185.41		

420730095510701. Local number, 84-43-04 ABAA1.
LOCATION.--Lat 42°07'30", long 95°51'07", Hydrologic Unit 10230005, approximately 4 mi southwest of the Town of Mapleton, on the north side of Iowa Highway 175. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Maple alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 72 ft, cased to 58 ft, slotted 53-58 ft, gravel-packed, open hole 58-72 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,090 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.40 ft above land-surface datum.
REMARKS.--Well WC-163.
PERIOD OF RECORD.--May 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.90 ft below land-surface datum, May 5, 1983; lowest measured, 15.21 ft below land-surface datum, July 7, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 05, 1983	6.90	FEB 07	13.24	JAN 06, 1986	14.19	APR 11	13.48
JUN 02	8.83	MAR 07	12.36	APR 07	11.82	JUL 18	14.20
JUL 05	7.82	APR 09	11.54	JUL 07	12.15	OCT 17	14.81
AUG 01	9.71	JUL 11	7.38	OCT 08	13.52	JAN 19, 1989	14.70
SEP 07	10.66	OCT 15	14.27	JAN 12, 1987	13.77	APR 03	14.68
OCT 04	12.57	JAN 07, 1985	11.91	APR 13	10.84	JUL 07	15.21
NOV 09	14.13	APR 01	13.27	JUL 06	11.88		
DEC 07	13.28	JUL 10	12.89	OCT 07	12.07		
JAN 11, 1984	13.26	OCT 07	13.99	JAN 11, 1988	13.20		



MONONA COUNTY

420406095543301. Local number, 84-44-24 DCAD1.

LOCATION.--Lat 42°04'06", long 95°54'33", Hydrologic Unit 10230005, on the south side of the Town of Castana, 0.25 mi east of Iowa Highway 175. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Maple terrace: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 74 ft, cased to 71 ft, slotted 66.5-71 ft, gravel-packed, open hole 71-74 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,105 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.10 ft above land-surface datum.

REMARKS.--Well WC-166.

PERIOD OF RECORD.--May 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.79 ft below land-surface datum, April 13, 1987; lowest measured, 22.54 ft below land-surface datum, October 7, 1985.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 10, 1983	19.56	FEB 07	20.66	JAN 06, 1986	20.19	APR 11	19.56
JUN 02	19.92	MAR 07	20.38	APR 06	19.45	JUL 18	20.25
JUL 05	19.95	APR 10	19.76	JUL 07	19.45	OCT 17	20.66
AUG 01	19.36	JUL 11	19.34	OCT 08	19.90	JAN 19, 1989	20.24
SEP 07	21.14	OCT 15	20.03	JAN 12, 1987	19.60	APR 03	19.90
OCT 04	21.76	JAN 07, 1985	19.89	APR 13	18.79	JUL 07	20.66
NOV 09	20.83	APR 01	20.10	JUL 06	19.25		
DEC 06	20.77	JUL 10	20.29	OCT 07	22.24		
JAN 11, 1984	20.76	OCT 07	22.54	JAN 11, 1988	19.30		

421018095582001. Local number, 85-44-16 CDAA1.

LOCATION.--Lat 42°10'18", long 95°58'20", Hydrologic Unit 10230003, approximately 1.25 mi west of the Town of Ticonic on the north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Dakota: in sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 81 ft, cased to 77 ft, slotted 67-77 ft, gravel-packed, open hole 77-81 ft.

METHOD.--Quarterly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.25 ft above land-surface datum.

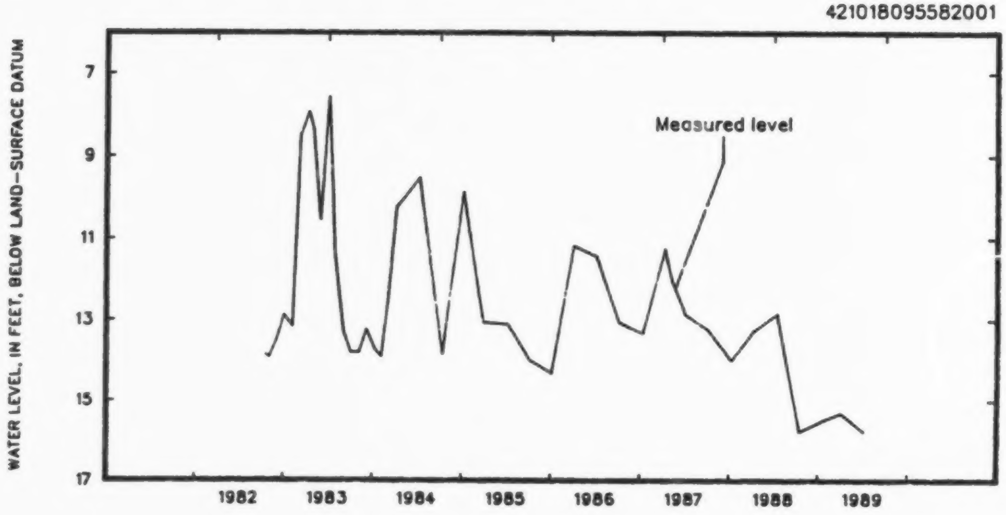
REMARKS.--Well WC-155.

PERIOD OF RECORD.--October 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.57 ft below land-surface datum, July 5, 1983; lowest measured, 15.77 ft below land-surface datum, October 17, 1988 and July 7, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18, 1982	13.85	SEP 07	13.34	APR 01	13.08	OCT 07	13.25
NOV 02	13.92	OCT 04	13.81	JUL 10	13.12	JAN 11, 1988	14.00
DEC 02	13.50	NOV 07	13.81	OCT 07	14.00	APR 11	13.27
JAN 03, 1983	12.88	DEC 07	13.24	JAN 06, 1986	14.33	JUL 18	14.84
FEB 08	13.16	JAN 11, 1984	13.74	APR 07	11.18	OCT 17	15.77
MAR 10	8.48	FEB 07	13.91	JUL 07	11.44	JAN 19, 1989	15.48
APR 12	7.93	MAR 07	12.44	OCT 08	13.07	APR 03	15.30
MAY 02	8.36	APR 09	10.23	JAN 12, 1987	13.34	JUL 07	15.77
JUN 02	10.54	JUL 11	9.52	APR 13	11.25		
JUL 05	7.57	OCT 15	13.85	MAY 13	12.04		
AUG 01	11.38	JAN 07, 1985	9.88	JUL 06	12.87		

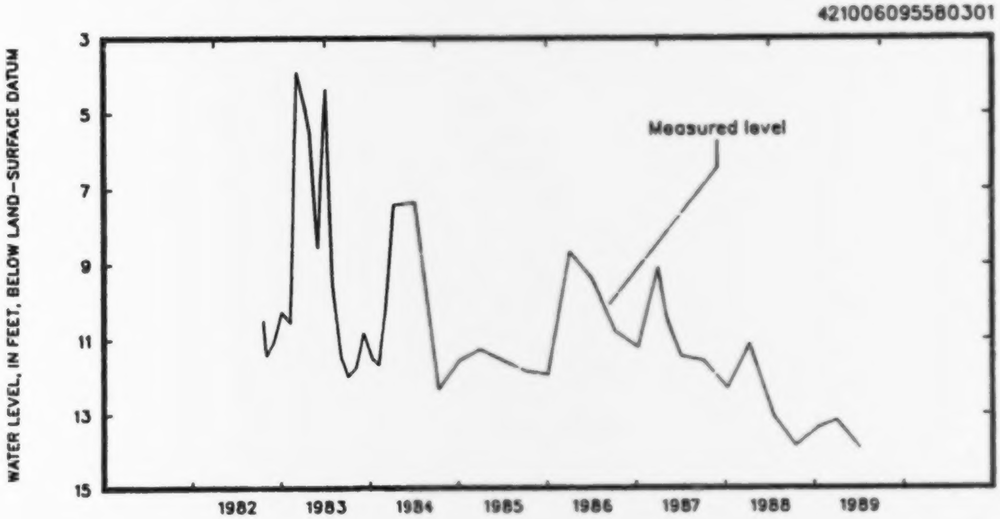


MONONA COUNTY

421006095580301. Local number, 85-44-16 DCDD1.
LOCATION.--Lat 42°10'06", long 95°58'03", Hydrologic Unit 10230003, approximately 0.75 mi west of the Town of Ticonic on the north side of County Road E-16. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Little Sioux alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 43 ft, cased to 40 ft, slotted 35-40 ft, gravel-packed. Open to Dakota sandstone 40-43 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,060 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.
REMARKS.--Well WC-156.
PERIOD OF RECORD.--October 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.92 ft below land-surface datum, March 10, 1983; lowest measured, 13.92 ft below land-surface datum, July 7, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18, 1982	10.48	SEP 07	11.49	APR 01	11.25	OCT 07	11.57
NOV 02	11.41	OCT 04	11.97	JUL 10	11.51	JAN 11, 1988	12.30
DEC 02	11.04	NOV 07	11.72	OCT 07	11.85	APR 11	11.12
JAN 03, 1983	10.26	DEC 07	10.82	JAN 06, 1986	11.94	JUL 18	13.04
FEB 08	10.54	JAN 11, 1984	11.50	APR 07	8.66	OCT 17	13.86
MAR 10	3.92	FEB 07	11.66	JUL 07	9.39	JAN 19, 1989	13.35
APR 12	4.82	MAR 07	10.11	OCT 08	10.78	APR 03	13.16
MAY 02	5.51	APR 09	7.40	JAN 12, 1987	11.21	JUL 07	13.92
JUN 02	8.53	JUL 11	7.33	APR 03	9.09		
JUL 05	4.37	OCT 15	12.32	MAY 13	10.53		
AUG 01	9.48	JAN 07, 1985	11.54	JUL 06	11.45		



421018095591301. Local number, 85-44-17 DCAA1.
LOCATION.--Lat 42°10'18", long 95°59'13", Hydrologic Unit 10230003, approximately 2.5 mi southwest of the Town of Rodney on the north side of County Road L-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 135 ft, cased to 135 ft, slotted 115-125 ft, gravel-packed.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,110 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.70 ft above land-surface datum.
REMARKS.--Well WC-158.
PERIOD OF RECORD.--October 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 49.89 ft below land-surface datum, July 11, 1984; lowest measured, 55.50 ft below land-surface datum, October 19, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 19, 1982	55.50	AUG 01	51.43	OCT 15	52.16	APR 13	51.83
NOV 02	55.43	SEP 07	52.57	JAN 07, 1985	51.80	JUL 06	51.54
DEC 02	55.08	OCT 04	53.01	APR 01	52.29	OCT 07	52.09
JAN 03, 1983	54.71	NOV 07	53.29	JUL 10	51.89	JAN 11, 1988	52.37
FEB 08	54.68	DEC 07	53.46	OCT 07	53.15	APR 11	52.68
MAR 10	53.67	JAN 11, 1984	53.60	JAN 06, 1986	53.67	JUL 18	53.42
APR 12	52.58	FEB 07	53.90	APR 07	52.46	OCT 17	54.50
MAY 02	51.80	MAR 07	53.16	JUL 07	51.45	JAN 19, 1989	54.81
JUN 02	51.36	APR 09	52.52	OCT 08	52.68	APR 03	54.75
JUL 05	50.85	JUL 11	49.89	JAN 12, 1987	52.73	JUL 07	54.88

MONTGOMERY COUNTY

410057095075101. Local number, 72-37-29 BABA1.
LOCATION.--Lat 41°00'57", long 95°07'51", Hydrologic Unit 10240005, approximately 4.35 mi east of the City of Red Oak, just south of County Road H-34. Owner: John Ogden.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Bored observation water-table well, diameter 3 in., depth 40 ft, cased to 40 ft, perforated. Interval of perforation not available.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,275 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.00 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--June 1937 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.94 ft below land-surface datum, June 20, 1984; lowest measured, dry, July 8, 1963 and February 3, 1964.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

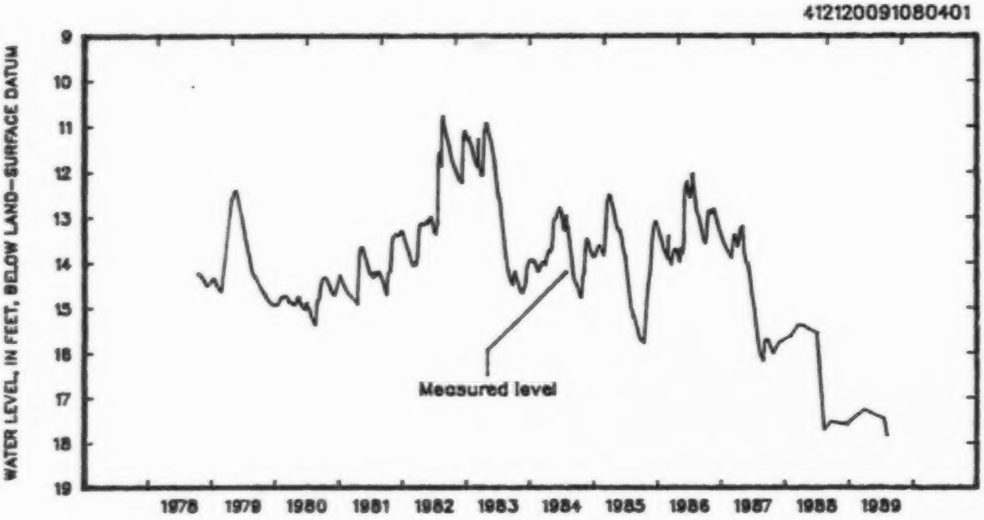
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 12	21.43	JAN 4	23.72	APR 18	24.69	JUL 5	18.49
25	21.70	24	25.06	MAY 10	25.90	AUG 15	20.31
NOV 17	20.80	FEB 9	25.23	JUN 2	26.88	SEP 9	11.53
DEC 16	22.41	MAR 1	25.95	JUL 3	18.29		

MUSCATINE COUNTY

412120091080401. Local number, 76-02-30 CBAA1.
LOCATION.--Lat 41°21'20", long 91°08'04", Hydrologic Unit 07080101, west of the Town of Fruitland on an Iowa State University Agricultural Experiment Farm. Owner: U.S. Geological Survey.
AQUIFER.--Alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 6 in., depth 27 ft, cased to 24 ft, screened 24-27 ft.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 546 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Base of recorder shelter, 3.70 ft above land-surface datum.
REMARKS.--Water-level recorder removed October 1987.
PERIOD OF RECORD.--May 1966 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 8.51 ft below land-surface datum, May 16, 1973; lowest measured, 17.86 ft below land-surface datum, August 2, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	17.57	DEC 14	17.59	MAR 22	17.27	JUL 21	17.59
NOV 04	17.59	FEB 02	17.42	JUL 13	17.48	AUG 02	17.86

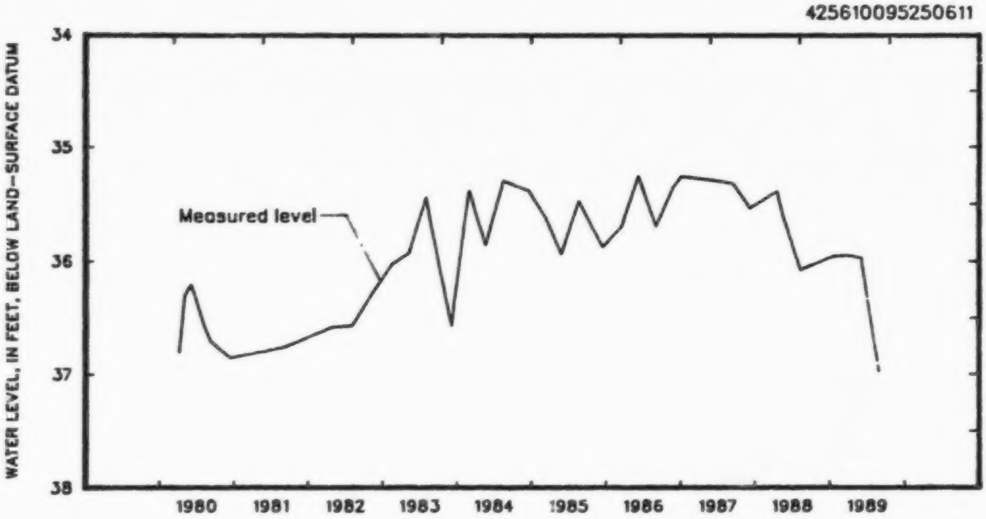


O'BRIEN COUNTY

425610095250611. Local number, 94-39-26 BADB11.
LOCATION.--Lat 42°56'10", long 95°25'06", Hydrologic Unit 10230003, near a dead-end road just south of the Little Sioux River, 0.9 mi north of Iowa Highway 10, approximately 5 mi southeast of the Town of Sutherland. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.50 in., depth 329 ft, cased to 329 ft, perforated 291-295 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,212 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.
REMARKS.--Well D-3.
PERIOD OF RECORD.--April 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 35.25 ft below land-surface datum, June 8, 1986 and January 6, 1987; lowest measured, 36.85 ft below land-surface datum, December 15, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	35.95	MAR 29	35.94	JUN 06	35.97	AUG 30	36.47



425808095480311. Local number, 94-42-09 DDDD11.
LOCATION.--Lat 42°58'08", long 95°48'03", Hydrologic Unit 10230003, west of Iowa Highway 143, 1 mi west and 1 mi north of the Village of Germantown. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 638 ft, cased to 638 ft, perforated 516-536 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,440 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.
REMARKS.--Well D-42.
PERIOD OF RECORD.--July 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 215.09 ft below land-surface datum, May 6, 1982; lowest measured, 260.64 ft below land-surface datum, July 10, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	240.79	JAN 19	241.12	APR 04	241.58	JUL 06	242.23

O'BRIEN COUNTY

430930095350401. Local number, 96-40-05 DDDA1.
LOCATION.--Lat 43°09'30", long 95°35'04", Hydrologic Unit 10230003, approximately 3 mi east of the Town of Sanborn and 2 mi south of U.S. Highway 18. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Ordovician and Dakota: in sandy shale of Ordovician age and sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 701 ft, cased to 701 ft, perforated 661-701 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,560 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.
REMARKS.--Well D-41.
PERIOD OF RECORD.--June 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 358.39 ft below land-surface datum, July 8, 1986; lowest measured, 361.40 ft below land-surface datum, July 16, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

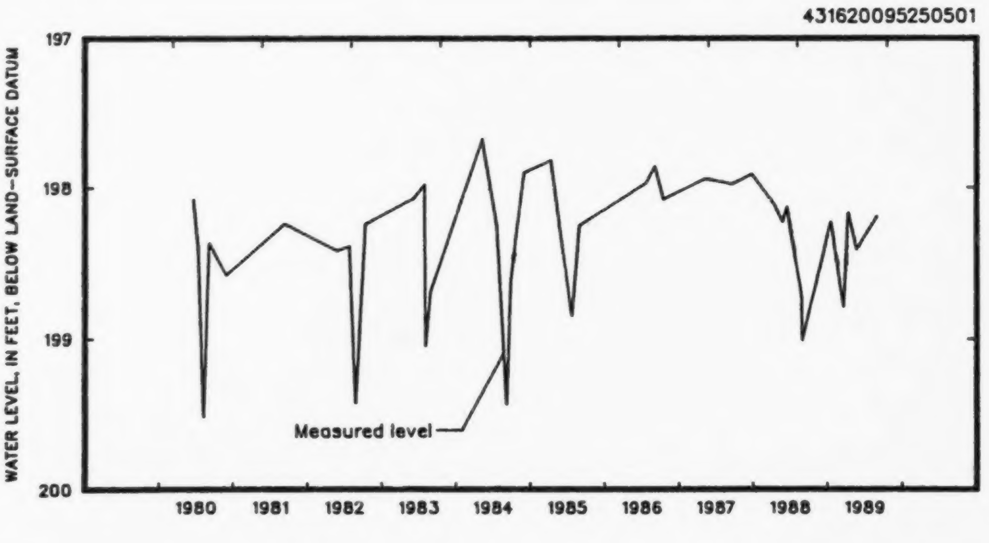
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	360.55	JAN 19	359.88	APR 04	359.90	JUL 05	360.11

OSCEOLA COUNTY

431620095250501. Local number, 98-39-26 CDAD1.
LOCATION.--Lat 43°16'20", long 95°25'05", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Cambrian-Ordovician: in St. Peter sandstone of Middle Ordovician age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 662 ft, cased to 662 ft, perforated 622-662 ft.
METHOD.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,402 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of low pipe, 1.47 ft above land-surface datum.
REMARKS.--Well D-38, Deep Hibbing.
PERIOD OF RECORD.--June 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 197.68 ft below land-surface datum, May 8, 1984; lowest measured, 199.52 ft below land-surface datum, August 5, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	198.23	APR 13	198.17	MAY 23	198.41	AUG 31	198.19
MAR 20	198.79						



OSCEOLA COUNTY

431620095250511. Local number, 98-39-26 CDAD11.
LOCATION.--Lat 43°16'20", long 95°25'05", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 345 ft, cased to 345 ft, perforated 335-345 ft.
METHOD.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,402 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of high pipe, 2.60 ft above land-surface datum.
REMARKS.--Well D-38, Shallow Hibbing.
PERIOD OF RECORD.--June 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 192.20 ft below land-surface datum, September 10, 1981; lowest measured, 194.11 ft below land-surface datum, July 25, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	193.89	APR 13	193.89	MAY 23	193.92	AUG 31	193.48
MAR 20	192.80						

431613095251801. Local number, 98-39-26 CDCC1.
LOCATION.--Lat 43°16'13", long 95°25'18", Hydrologic Unit 10230003, 3.5 mi south and 2.5 mi east of the Village of May City. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 500 ft, cased to 500 ft, perforated 490-500 ft.
METHOD.--Intermittent measurement with chalked tape by observer or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,398 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.70 ft above land-surface datum.
REMARKS.--Well D-39.
PERIOD OF RECORD.--June 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 189.99 ft below land-surface datum, June 17, 1980; lowest measured, 196.85 ft (nearby well pumping) below land-surface datum, September 6, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	191.40	APR 13	191.57	MAY 23	191.55	AUG 31	191.57
MAR 20	192.40						

431620095482402. Local number, 98-42-33 AABB2.
LOCATION.--Lat 43°16'20", long 95°48'24", Hydrologic Unit 10170204, approximately 2.75 mi south of the Town of Ashton, west of Iowa Highway 60, near the Chicago and Northwestern Railroad tracks. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 400 ft, cased to 400 ft, perforated 385-395 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,440 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.
REMARKS.--Well D-40.
PERIOD OF RECORD.--May 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 195.87 ft below land-surface datum, June 1, 1983; lowest measured, 226.19 ft below land-surface datum, July 06, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	223.70	JAN 19	224.61	APR 04	225.24	JUL 06	226.19

OSCEOLA COUNTY

432828095283611. Local number, 100-39-17 DCCB11.
LOCATION.--Lat 43°28'28", long 95°28'36", Hydrologic Unit 10230003, approximately 2 mi west and 2 mi north of the Town of Harris, east of County Road M-12. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in. to 461 ft, 4 in. to 760 ft, depth 760 ft, cased to 760 ft, perforated 680-700 ft.
METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,560 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.
REMARKS.--Well D-13.
PERIOD OF RECORD.--July 1980 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 341.80 ft below land-surface datum, August 5, 1980; lowest measured, 344.88 ft below land-surface datum, January 18, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

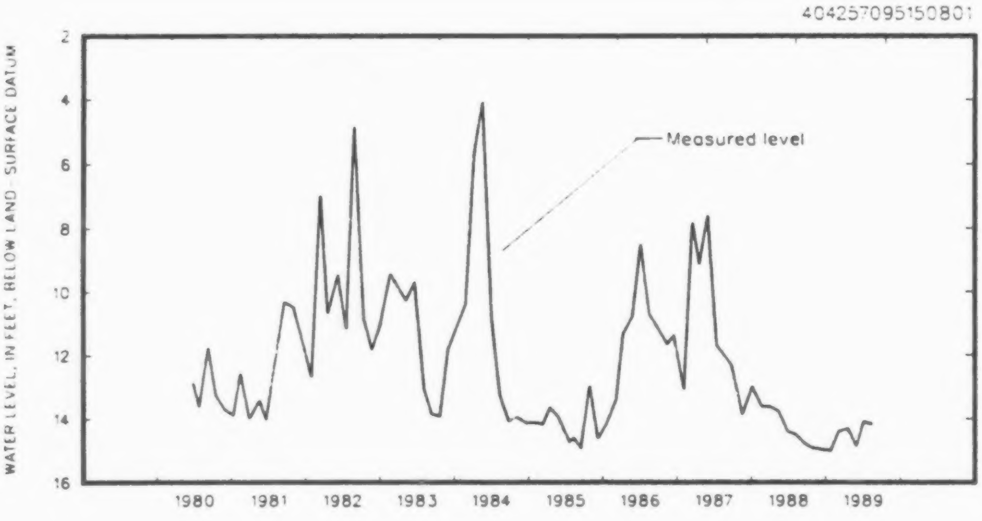
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	344.88	MAR 20	344.68	JUN 06	344.52	AUG 31	343.95

PAGE COUNTY

404257095150801. Local number, 68-38-07 CCAA1.
LOCATION.--Lat 40°42'57", long 95°15'08", Hydrologic Unit 10240005, approximately 2 mi south of the Village of Norwich and 1.5 mi west of County Road M-48. Owner: William Brayman.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in., depth 44 ft, lined with tile.
METHOD.--Intermittent measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,087 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of pipe inserted through board cover, 1.00 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--May 1934 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.09 ft below land-surface datum, March 26, 1946; lowest measured, 22.76 ft below land-surface datum, June 23, 1947.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 27	14.92	JAN 26	15.02	APR 21	14.31	JUL 07	14.10
DEC 13	14.98	MAR 08	14.40	JUN 02	14.85	AUG 17	14.19



PLYMOUTH COUNTY

424850096074801. Local number, 92-45-02 CBCB1.
LOCATION.--Lat 42°48'50", long 96°07'48", Hydrologic Unit 10230002, approximately 3.8 mi west and 0.6 mi south of the Village of Oyens. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Cambrian-Ordovician: in dolomite of Cambrian and Ordovician age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in. to 161 ft, 4 in. to 598 ft, 2 in. to 1,340 ft, depth 1,340 ft, cased to 598 ft, open hole 598-1,340 ft. Well deepened from 1,089 to 1,340 ft in May, 1984. Well penetrates Precambrian-aged rocks.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,245 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.
REMARKS.--Well D-21.
PERIOD OF RECORD.--May 1979 to January 1981, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 86.38 ft below land-surface datum, October 8, 1987; lowest measured, 102.10 ft below land-surface datum, August 6, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	91.11	JAN 19	89.39	APR 04	89.05	JUL 06	91.99

424833096324701. Local number, 92-48-06 DDDA1.
LOCATION.--Lat 42°48'33", long 96°32'47", Hydrologic Unit 10170203, just south of the curve on Iowa Highway 3, 1 mi south of the Town of Akron. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, depth 581 ft, diameter 4 in. to 184 ft, 2 in. to 581 ft, cased to 576 ft, perforated 430-434 ft and 510-515 ft, open hole 576-581 ft. Paleozoic rock open 576-581 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,282 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.80 ft above land-surface datum.
REMARKS.--Well D-35.
PERIOD OF RECORD.--December 1979 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 137.35 ft below land-surface datum, April 22, 1987; lowest measured, 159.82 ft below land-surface datum, August 6, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 06	138.00	MAR 15	137.85	APR 19	137.94	JUL 29	137.90

425249096125001. Local number, 93-46-12 DDDD1.
LOCATION.--Lat 42°52'49", long 96°12'50", Hydrologic Unit 10230002, 1 mi west and 1 mi south of the Village of Struble. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2.5 in., depth 570 ft, cased to 570 ft, perforated 356-360 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,280 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of coupling, 4.80 ft above land-surface datum.
REMARKS.--Well D-2.
PERIOD OF RECORD.--March 1980 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 117.78 ft below land-surface datum, April 9, 1980; lowest measured, 122.35 ft below land-surface datum, July 6, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	122.13	JAN 19	120.92	APR 04	120.62	JUL 06	122.35

POTTAWATTAMIE COUNTY

411024095085502. Local number, 74-38-36 BAAA2.
LOCATION.--Lat 41°10'24", long 95°09'55", Hydrologic Unit 10240003, approximately 1.5 mi north of the Town of Elliott on the soutwest corner of the junction of County Roads M-55 and G-66. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--East Nishnabotna alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 40 ft, cased 34-39 ft, gravel-packed. Original depth was 101 ft, back-filled with sand and a bentonite seal to 40 ft.
METHOD.--Twice a month measurement with chalked tape by observer.
DATUM.--Elevation of land-surface datum is 1,073 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.20 ft above land-surface datum.
REMARKS.--Well SW-34 B/L.
PERIOD OF RECORD.--August 1986 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.07 ft below land-surface datum, September 10, 1989; lowest measured, 9.95 ft below land-surface datum, May 25, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1985 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 06, 1986	6.39	JUL 10	3.57	JAN 11, 1988	7.34	DEC 10	9.46
OCT 23	3.80	25	5.30	26	7.49	26	9.41
DEC 09	5.54	AUG 03	4.80	FEB 10	7.58	JAN 10, 1989	9.43
24	5.94	10	5.03	25	7.74	28	9.55
JAN 10, 1987	6.68	25	5.49	MAR 10	7.91	FEB 10	9.52
25	6.87	26	4.78	25	8.50	26	9.42
FEB 05	7.20	28	4.46	APR 10	8.24	MAR 10	8.51
10	7.29	30	4.89	25	8.38	25	9.17
25	7.55	SEP 01	5.20	MAY 10	8.52	APR 10	9.62
MAR 10	7.29	03	5.50	25	8.66	25	9.76
25	6.64	05	5.75	JUN 10	8.75	MAY 10	9.85
APR 01	6.31	07	5.51	25	8.88	25	9.95
10	5.64	10	5.81	JUL 10	8.71	JUN 10	9.10
25	5.17	24	5.08	25	8.85	25	5.13
MAY 01	5.36	OCT 10	6.16	AUG 10	9.15	JUL 10	7.87
10	5.86	12	6.13	27	9.27	25	8.67
21	5.69	25	6.57	SEP 10	9.54	AUG 10	9.14
25	5.00	NOV 05	6.98	25	9.48	27	9.31
JUN 01	2.11	10	6.98	OCT 10	9.45	SEP 10	2.07
10	3.97	29	7.14	25	9.53	25	7.48
25	5.47	DEC 10	6.89	NOV 10	9.55		
JUL 07	5.80	25	7.22	25	9.20		

411359095171901. Local number, 74-39-01 CCCC1.
LOCATION.--Lat 41°13'59", long 95°17'19", Hydrologic Unit 10240002, approximately 6.5 mi east of the Town of Carson, on the northeast corner of the junction of Iowa Highway 92 and County Road M-41. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Buried channel: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in., depth 216 ft, cased to 206 ft, slotted 189-206 ft, gravel-packed, open to Pennsylvanian shale 207-216 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,245 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.32 ft above land-surface datum.
REMARKS.--Well SW-21.
PERIOD OF RECORD.--August 1986 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 124.86 ft below land-surface datum, April 4, 1988; lowest measured, 128.02 ft below land-surface datum, September 29, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1985 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 20, 1986	129.38	MAR 11	126.83	AUG 25	125.86	SEP 20	125.95
OCT 23	127.08	18	126.05	SEP 29	125.78	OCT 20	126.05
DEC 09	127.04	APR 15	126.22	OCT 12	125.73	DEC 21	126.59
10	127.09	21	126.67	NOV 12	125.36	FEB 09, 1989	127.21
15	127.02	MAY 21	126.19	17	125.15	MAR 01	126.93
JAN 02, 1987	126.70	27	126.19	DEC 16	125.59	APR 19	127.17
12	126.75	JUN 01	126.09	JAN 03, 1988	125.45	MAY 31	127.23
22	126.56	18	126.16	FEB 24	125.66	JUN 26	127.20
FEB 02	126.53	JUL 07	126.08	APR 04	124.86	AUG 21	127.66
04	127.02	15	125.97	MAY 16	125.38	SEP 29	128.02
05	127.38	AUG 03	126.08	JUN 28	125.52		
24	126.74	18	125.97	AUG 10	125.73		

POTTAWATTAMIE COUNTY

411246095502001. Local number, 74-43-18 BCCC1.

LOCATION.--Lat 41°12'46", long 95°50'20", Hydrologic Unit 10230006, approximately 0.4 mi east of Lake Manawa in Manawa State Park, 1.4 mi south of Interstate 80, south of the City of Council Bluffs. Owner: U.S. Geological Survey.

AQUIFER.--Alluvial: in sand and gravel of Holocene age.

WELL CHARACTERISTICS.--Bored observation water-table well, diameter 1.25 in., depth 16 ft, cased to 14 ft, sand point 14-16 ft.

METHOD.--Monthly measurement with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 975 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.25 ft above land-surface datum.

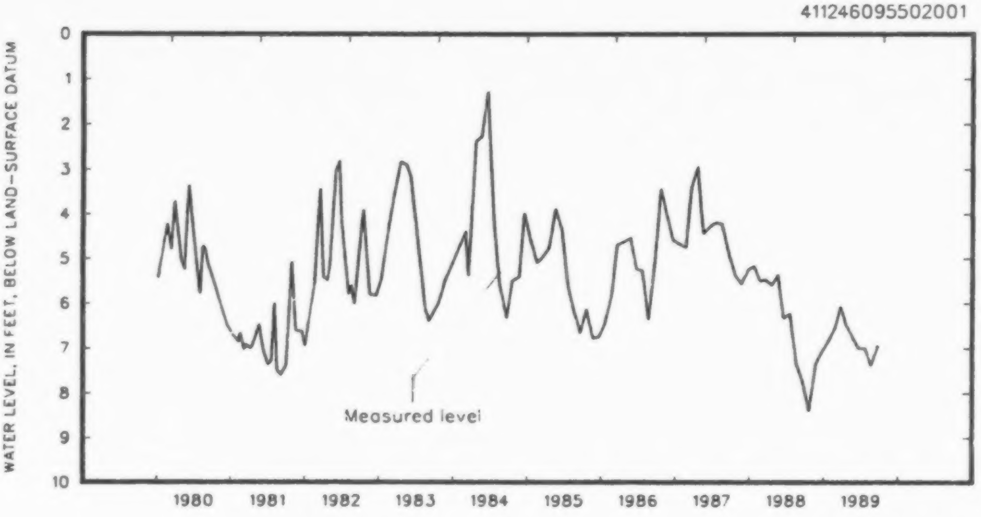
REMARKS.--None.

PERIOD OF RECORD.--November 1950 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.45 ft below land-surface datum, May 2, 1951; lowest measured, 11.86 ft below land-surface datum, June 26, 1956.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 26	8.38	JAN 27	6.83	APR 24	6.48	JUL 26	7.00
NOV 28	7.33	FEB 28	6.54	MAY 24	6.74	AUG 24	7.37
DEC 21	7.11	MAR 27	6.07	JUN 23	6.99	SEP 27	6.94



SAC COUNTY

422500095084801. Local number, 88-37-22 CCCC1.

LOCATION.--Lat 42°25'00", long 95°08'48", Hydrologic Unit 10230007, approximately 3 mi south of the Town of Early or 0.5 mi south of the junction of U.S. Highways 20 and 71. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.

AQUIFER.--Pennsylvanian and Dakota: in limestone of Pennsylvanian age and sandstone of Cretaceous age.

WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 435 ft, cased to 435 ft, perforated 417-435 ft.

METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.

REMARKS.--Well D-16.

PERIOD OF RECORD.--December 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 163.93 ft below land-surface datum, May 12, 1984; lowest measured, 165.40 ft below land-surface datum, December 16, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
DEC 29	163.92	MAR 29	164.85	MAY 31	164.95	SEP 01	165.16

SAC COUNTY

422850095171501. Local number, 89-38-36 CBCC1.
LOCATION.--Lat 42°28'50", long 95°17'15", Hydrologic Unit 10230005, just east of Iowa Highway 110, 0.75 mi south of the Town of Schaller and 0 .25 mi north of U.S. Highway 20. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 521 ft, cased to 512 ft, perforated 410-430 ft, open hole 512-521 ft. Open to 9 ft of Paleozoic rock.
METHOD.--Quarterly measurement with electric line or chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,445 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.
REMARKS.--Well D-17.
PERIOD OF RECORD.--December 1978 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 288.05 ft below land-surface datum, June 2, 1980; lowest measured, 292.28 ft below land-surface datum, May 31, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 18	291.48	MAR 29	291.82	MAY 31	292.28	SEP 01	291.78

SCOTT COUNTY

413544090212901. Local number, 78-5E-03 AADA1.
LOCATION.--Lat 41°35'44", long 90°21'29", Hydrologic Unit 07080101, at the Bridgeview Elementary School, corner of 12th and Davenport Streets, Le Claire. Owner: City of Le Claire.
AQUIFER.--Cambrian-Ordovician: in sandstone of Late Cambrian and sandstone and sandy dolomite of Early Ordovician age.
WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 16 to 12 in., depth 1,607 ft, cased to 1,128 ft, open hole 1,128-1,607 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 703 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 2.11 ft above land-surface datum.
REMARKS.--Le Claire Well No. 3.
PERIOD OF RECORD.--July 1975 to current year.
REVISED RECORDS.--WRD IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 247.46 ft below land-surface datum, July 8, 1975; lowest recorded, 276.88 ft below land-surface datum, September 1, 1978.
REVISION.--Lowest water level recorded, 276.88 ft below land-surface datum, September 1, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 21	261.76	FEB 27	260.00	MAY 08	260.91	JUL 31	266.17
DEC 14	260.66	APR 04	260.26	JUN 26	262.71	SEP 18	267.46
JAN 04	260.74						

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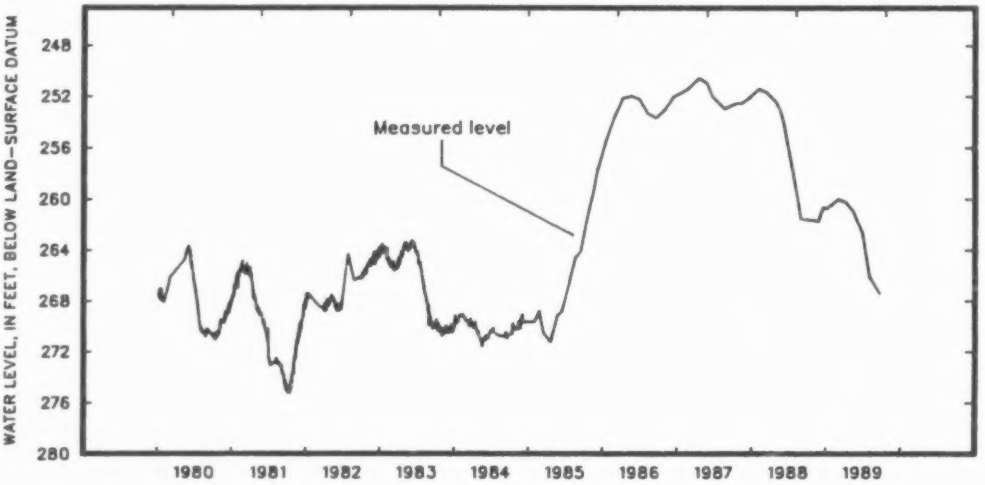
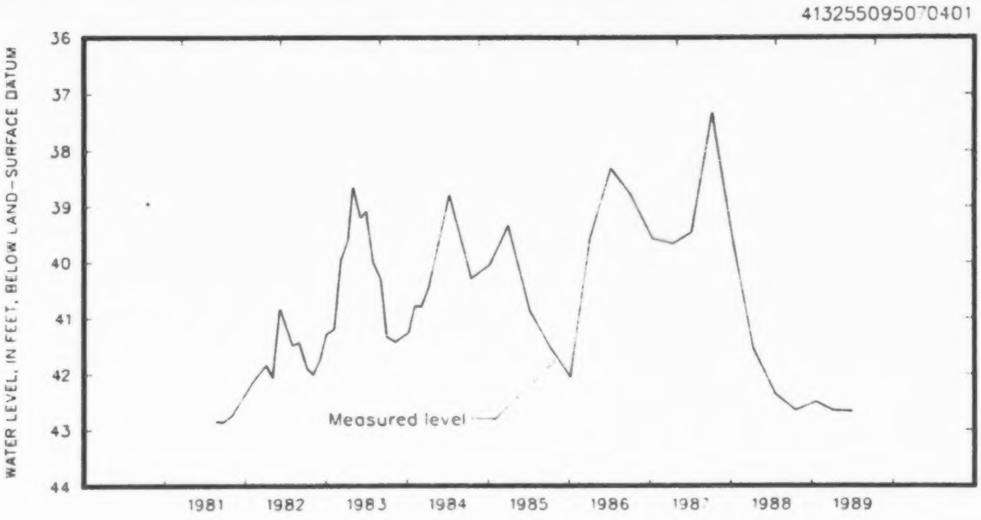


SHELBY COUNTY

413255095070401. Local number, 78-37-17 DDDD1.
LOCATION.--Lat 41°32'55", long 95°07'04", Hydrologic Unit 10240003, 3 mi south and 3 mi west of the Town of Elkhorn on the east side of County Road M-56 near Elkhorn Creek. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 181 ft, cased to 181 ft, slotted 121-179 ft, gravel-packed, open to Pennsylvanian shale and limestone 140-181 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,208 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.80 ft above land-surface datum.
REMARKS.--Well WC-16.
PERIOD OF RECORD.--August 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 37.33 ft below land-surface datum, October 9, 1987; lowest measured, 42.86 ft below land-surface datum, September 24, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 19, 1981	42.85	JAN 04, 1983	41.27	MAR 06	40.78	APR 15	39.67
SEP 24	42.86	FEB 08	41.18	APR 10	40.42	JUL 09	39.45
NOV 03	42.73	MAR 10	39.93	JUL 10	38.79	OCT 09	37.33
FEB 05, 1982	42.13	APR 11	39.57	OCT 17	40.29	JAN 14, 1988	39.67
APR 06	41.83	MAY 03	38.65	JAN 09, 1985	40.03	APR 12	41.54
MAY 06	42.06	JUN 06	39.19	APR 02	39.33	JUL 20	42.36
JUN 07	40.83	JUL 01	39.08	JUL 11	40.88	OCT 19	42.65
JUL 07	41.07	AUG 02	40.01	OCT 09	41.51	JAN 20, 1989	42.49
AUG 03	41.48	SEP 06	40.32	JAN 08, 1986	42.05	APR 05	42.65
SEP 01	41.42	OCT 03	41.33	APR 09	39.53	JUL 05	42.67
OCT 07	41.89	NOV 10	41.42	JUL 09	38.31		
NOV 04	42.00	JAN 10, 1984	41.24	OCT 06	38.78		
DEC 07	41.71	FEB 06	40.77	JAN 14, 1987	39.58		



413442095193101. Local number, 78-39-10 BBBA1.
LOCATION.--Lat 41°34'42", long 95°19'31", Hydrologic Unit 10240002, approximately 4.5 mi south of the City of Harlan and 0.25 mi east of the Town of Corely on the north side of County Road F-58. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--West Nishnabotna alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 44 ft, cased to 44 ft, slotted 40-44 ft, gravel-packed.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,168 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.50 ft above land-surface datum.
REMARKS.--Well WC-200.
PERIOD OF RECORD.--June 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.97 ft below land-surface datum, July 9, 1986; lowest measured, 22.98 ft below land-surface datum, October 19, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

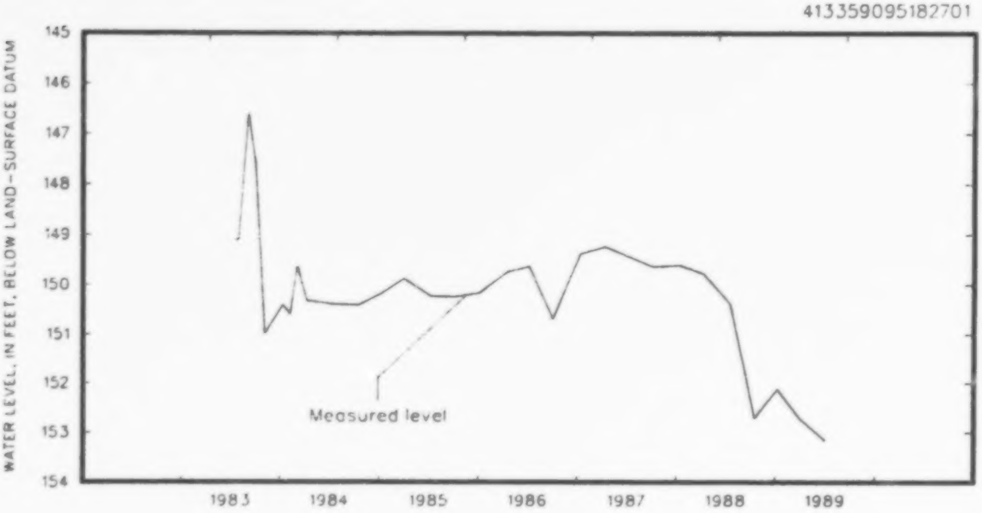
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 07, 1983	20.12	MAR 06	21.14	JAN 08, 1986	22.17	JAN 04, 1988	21.57
JUL 06	19.57	APR 10	20.50	APR 09	19.30	APR 12	22.27
AUG 02	21.00	JUL 10	19.21	JUL 09	18.97	JUL 20	22.42
SEP 06	21.97	OCT 15	21.40	OCT 06	21.10	OCT 19	22.98
OCT 03	22.29	JAN 09, 1985	21.13	JAN 14, 1987	21.27	JAN 20, 1989	22.49
NOV 08	22.29	APR 02	21.83	APR 15	19.40	APR 05	22.75
JAN 12, 1984	21.85	JUL 11	21.92	JUL 09	20.38	JUL 05	22.31
FEB 09	21.66	OCT 09	22.40	OCT 09	21.39		

SHELBY COUNTY

413359095182701. Local number, 78-39-11 CCBC1.
LOCATION.--Lat 41°33'59", long 95°18'27", Hydrologic Unit 10240002, approximately 5.5 mi south of the City of Harlan, 0.75 mi south of County Road F-58, and 1.5 mi east of U.S. Highway 59. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 541 ft, cased to 541 ft, slotted 520-535 ft, gravel-packed. Open to Pennsylvanian shale 537-541 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,310 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.65 ft above land-surface datum.
REMARKS.--Well WC-227.
PERIOD OF RECORD.--July 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 146.61 ft below land-surface datum, September 6, 1983; lowest measured, 153.16 ft below land-surface datum, July 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 21, 1983	149.12	APR 10	150.32	APR 19	149.73	JUL 20	150.39
AUG 02	149.07	JUL 10	150.39	JUL 09	149.62	OCT 19	152.70
SEP 06	146.61	OCT 17	150.41	OCT 06	150.68	JAN 20, 1989	152.11
OCT 03	147.56	JAN 09, 1985	150.17	JAN 14, 1987	149.37	APR 05	152.72
NOV 08	150.98	APR 02	149.87	APR 15	149.23	JUL 05	153.16
JAN 12, 1984	150.40	JUL 11	150.23	OCT 09	149.64		
FEB 09	150.59	OCT 09	150.24	JAN 14, 1988	149.60		
MAR 06	149.63	JAN 08, 1986	150.15	APR 12	149.78		



413031095204901. Local number, 78-39-32 DDAA1.
LOCATION.--Lat 41°30'31", long 95°20'49", Hydrologic Unit 10240002, approximately 2 mi north of the Town of Avoca, 0.60 mi west of U.S. Highway 59. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--West Nishnabotna alluvial: in sand and gravel of Holocene age.
WELL CHARACTERISTICS.--Drilled observation water-table well, diameter 2 in., depth 27 ft, cased to 24 ft, slotted 21-24 ft, gravel-packed, open hole 24-27 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,144 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.95 ft above land-surface datum.
REMARKS.--Well WC-197.
PERIOD OF RECORD.--June 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.04 ft below land-surface datum, July 10, 1984; lowest measured, 18.17 ft below land-surface datum, July 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

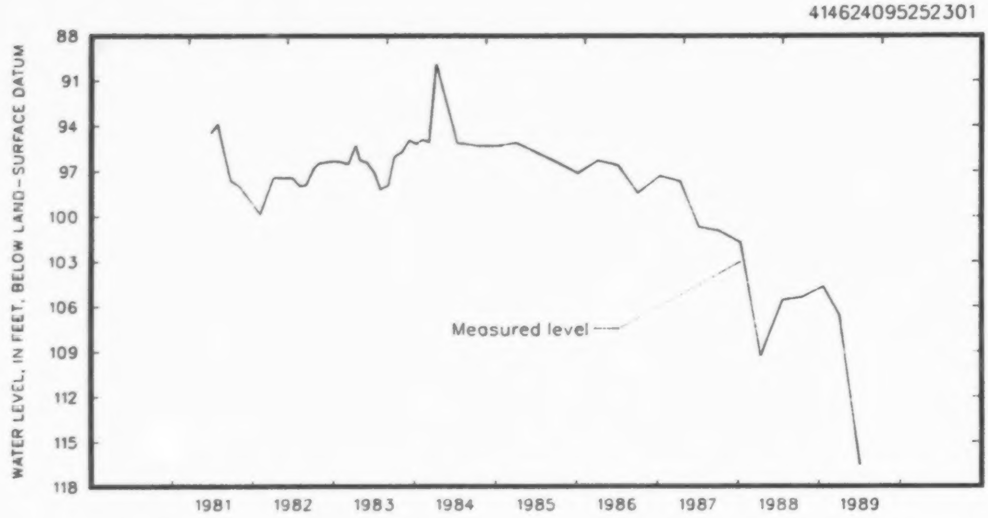
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 06, 1983	12.04	MAR 06	15.17	APR 19	14.68	APR 12	15.42
JUL 06	9.52	APR 10	14.71	JUL 09	9.84	JUL 20	16.55
AUG 02	12.10	JUL 10	8.04	OCT 06	11.71	OCT 19	17.64
SEP 06	14.08	OCT 17	13.05	JAN 14, 1987	11.12	JAN 20, 1989	17.76
OCT 03	16.51	JAN 09, 1985	11.75	APR 15	8.34	APR 05	17.71
NOV 08	15.11	APR 02	13.81	MAY 13	9.33	JUL 05	18.17
DEC 13	15.36	JUL 11	14.65	JUL 09	8.67		
JAN 12, 1984	15.70	OCT 09	15.60	OCT 09	13.41		
FEB 09	15.71	JAN 08, 1986	16.32	JAN 14, 1988	14.65		

SHELBY COUNTY

414624095252301. Local number, 80-39-06 AADC1.
LOCATION.--Lat 41°46'24", long 95°25'23", Hydrologic Unit 10230006, west of the Town of Earling on the north side of Iowa Highway 37 near the junction of Iowa Highways 37 and 191. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 370 ft, cased to 370 ft, slotted 332-347 ft, open to Pennsylvanian sandstone, shale, and limestone 347-370 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,305 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.60 ft above land-surface datum.
REMARKS.--Well WC-10.
PERIOD OF RECORD.--June 1981 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 93.87 ft below land-surface datum, July 28, 1981; lowest measured, 116.56 ft below land-surface datum, July 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1980 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUN 26, 1981	94.45	DEC 02	96.36	JAN 10, 1984	95.20	OCT 06	98.45
JUL 28	93.87	JAN 04, 1983	96.29	FEB 06	94.88	JAN 14, 1987	97.29
SEP 24	97.61	FEB 08	96.40	MAR 07	95.07	APR 15	97.68
NOV 03	98.02	MAR 10	96.53	APR 10	89.91	JUL 09	100.72
FEB 04, 1982	99.85	APR 12	95.30	JUL 11	95.13	OCT 09	100.98
APR 06	97.41	MAY 02	96.27	OCT 17	95.35	JAN 14, 1988	101.76
MAY 06	97.41	JUN 02	96.43	JAN 09, 1985	95.30	APR 12	109.29
JUN 07	97.44	JUL 05	97.10	APR 02	95.08	JUL 20	105.55
JUL 02	97.46	AUG 02	98.20	JUL 11	95.80	OCT 19	105.35
AUG 04	97.99	SEP 06	97.91	OCT 09	96.43	JAN 20, 1989	104.66
SEP 01	97.88	OCT 03	96.02	JAN 08, 1986	97.14	APR 05	106.68
OCT 07	96.76	NOV 08	95.67	APR 09	96.27	JUL 05	116.56
NOV 01	96.43	DEC 08	94.94	JUL 09	96.62		



414856095160101. Local number, 81-38-21 ADAD1.
LOCATION.--Lat 41°48'56", long 95°16'01", Hydrologic Unit 10240002, approximately 3.75 mi east of the Town of Defiance on the west side of County Road M-36. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Fremont buried channel: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 535 ft, cased to 535 ft, slotted 525-535 ft, gravel-packed. Open to Pennsylvanian shale 530-535 ft.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.90 ft above land-surface datum.
REMARKS.--Well WC-222.
PERIOD OF RECORD.--August 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 208.09 ft below land-surface datum, April 15, 1987; lowest measured, 210.95 ft below land-surface datum, July 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1982 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 02, 1983	209.70	APR 10	209.08	JUL 09	208.41	JUL 20	208.90
SEP 06	209.91	JUL 11	209.05	OCT 06	208.50	OCT 19	210.17
OCT 03	209.75	JAN 09, 1985	208.93	JAN 14, 1987	208.20	JAN 20, 1989	210.13
NOV 08	209.61	APR 02	208.57	APR 15	208.09	APR 05	210.42
DEC 00	209.14	JUL 11	208.91	JUL 09	208.31	JUL 05	210.95
JAN 10, 1984	209.43	OCT 09	209.10	OCT 09	208.56		
FEB 06	209.25	JAN 08, 1986	208.95	JAN 14, 1988	208.35		
MAR 06	209.02	APR 09	208.57	APR 12	208.40		

SIOUX COUNTY

430140095573101. Local number, 95-43-07 AAAA1.
LOCATION.--Lat 43°04'10", long 95°57'32", Hydrologic Unit 10230002, just south of County Road B-40, 1 mi east of the Village of Newkirk. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 681 ft, cased to 681 ft, perforated 641-681 ft. Open to Paleozoic rock from 674-681 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,390 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.
REMARKS.--Well D-43.
PERIOD OF RECORD.--July 1980 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 213.66 ft below land-surface datum, March 13, 1984; lowest measured, 218.24 ft below land-surface datum, October 8, 1987.
REVISION.--Highest water level measured, 213.66 ft below land-surface datum, March 13, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	217.38	JAN 19	216.94	APR 04	216.78	JUL 06	217.36

430913096033201. Local number, 96-44-08 ADAA1.
LOCATION.--Lat 43°09'13", long 96°03'32", Hydrologic Unit 10230002, west side of County Road K-64, approximately 2.5 mi west of the Town of Boyden and approximately 2.2 mi south of U.S. Highway 18. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 682 ft, cased to 682 ft, perforated 647-667 ft. Open to Paleozoic rock 681-682 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,373 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.70 ft above land-surface datum.
REMARKS.--Well D-44.
PERIOD OF RECORD.--August 1980 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 187.85 ft below land-surface datum, October 16, 1984; lowest measured, 195.12 ft below land-surface datum, July 6, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 18	195.09	JAN 19	194.59	APR 04	194.34	JUL 06	195.12

STORY COUNTY

420137093361501. Local number, 83-24-02 DBAD1.
LOCATION.--Lat 42°01'37", long 93°36'15", Hydrologic Unit 07080105, in Ames, north of the Chicago and Northwestern Railroad and County Road E-41, approximately 0.75 mi east of U.S. Highway 69. Owner: City of Ames.
AQUIFER.--Glacial drift: in sand and gravel of Pleistocene age.
WELL CHARACTERISTICS.--Drilled municipal well, depth 124 ft, casing information unavailable.
METHOD.--Quarterly measurement with chalked tape or electric line by USGS personnel.
DATUM.--Elevation of land-surface datum is 926 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.82 ft above land-surface datum.
REMARKS.--City well #4.
PERIOD OF RECORD.--September 1987 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 55.50 ft below land-surface datum, September 17, 1987; lowest measured, 60.76 ft below land-surface datum, September 20, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEARS OCTOBER 1986 TO SEPTEMBER 1989

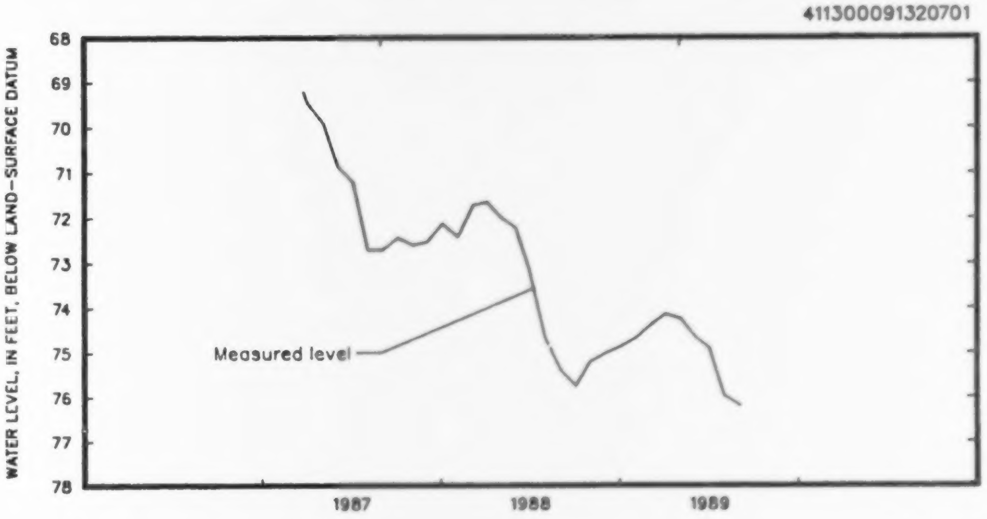
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
SEP 17, 1987	55.50	JUN 22	58.98	DEC 15	59.16	JUL 07	56.47
MAR 22, 1988	56.10	SEP 20	60.76	MAR 08, 1989	55.73	SEP 14	57.94

WASHINGTON COUNTY

411300091320701. Local number, 74-06-15 BDAC1.
LOCATION.--Lat 41°13'00", long 91°32'07", Hydrologic Unit 07080107, in the water treatment plant, beneath the water tower in Crawfordsville. Owner: Town of Crawfordsville.
AQUIFER.--Mississippian: in dolomite of Mississippian age.
WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 6.5 in., depth 215 ft, cased to 132 ft, open hole 132-215 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.10 ft above land-surface datum.
REMARKS.--Water level for September 13, 1983, 72.69 ft below land-surface datum.
PERIOD OF RECORD.--September 1983, March 1987 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.23 ft below land-surface datum, March 25, 1987; lowest measured, 76.22 ft below land-surface datum, September 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	75.76	JAN 04	74.86	APR 04	74.14	JUL 03	74.92
NOV 01	75.21	FEB 02	74.68	MAY 05	74.26	AUG 02	75.98
DEC 02	75.02	MAR 06	74.38	JUN 02	74.64	SEP 05	76.22



411244091323501. Local number, 74-06-15 CBDD1.
LOCATION.--Lat 41°12'41", long 91°32'19", Hydrologic Unit 07080107, just west of U.S. Highway 218, approximately 0.4 mi southeast of the water tower in Crawfordsville. Owner: Town of Crawfordsville.
AQUIFER.--Mississippian: in dolomite of Mississippian age.
WELL CHARACTERISTICS.--Drilled unused municipal artesian water well, diameter 8 in., depth 217 ft, cased to 142 ft, open hole 142-217 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 725 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.67 ft above land-surface datum.
REMARKS.--Water level for Sep. 13, 1983, 75.46 ft below land-surface datum.
PERIOD OF RECORD.--September 1983, March 1987 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 71.62 ft below land-surface datum, March 25, 1987; lowest measured, 78.50 ft below land-surface datum, September 5, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	78.11	JAN 04	77.36	APR 04	76.53	JUL 03	77.21
NOV 01	77.77	FEB 02	77.19	MAY 05	76.79	AUG 02	78.19
DEC 02	77.60	MAR 06	76.84	JUN 02	76.99	SEP 05	78.50

WASHINGTON COUNTY

421829091304701. Local number, 75-06-14 ABBB1.
LOCATION.--Lat 41°18'27", long 91°30'47", Hydrologic Unit 07080209, 1 mi north and 1.5 mi east of the junction of U.S. Highway 218 and Iowa Highway 92. Owner: Mrs. David Armstrong.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Bored unused water-table well, diameter 12 in., depth 45 ft, lined with tile.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple welded to barrel, 4.08 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--December 1983 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.53 ft below land-surface datum, May 23, 1984; lowest measured, 12.65 ft below land-surface datum, November 1, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	12.01	DEC 02	11.85	MAR 06	11.66	JUL 03	7.58
11	12.27	14	12.35	APR 04	10.07	AUG 02	8.61
NOV 01	12.65	JAN 04	11.85	MAY 05	5.66	SEP 05	7.81
15	12.06	FEB 02	11.94	JUN 02	7.77		

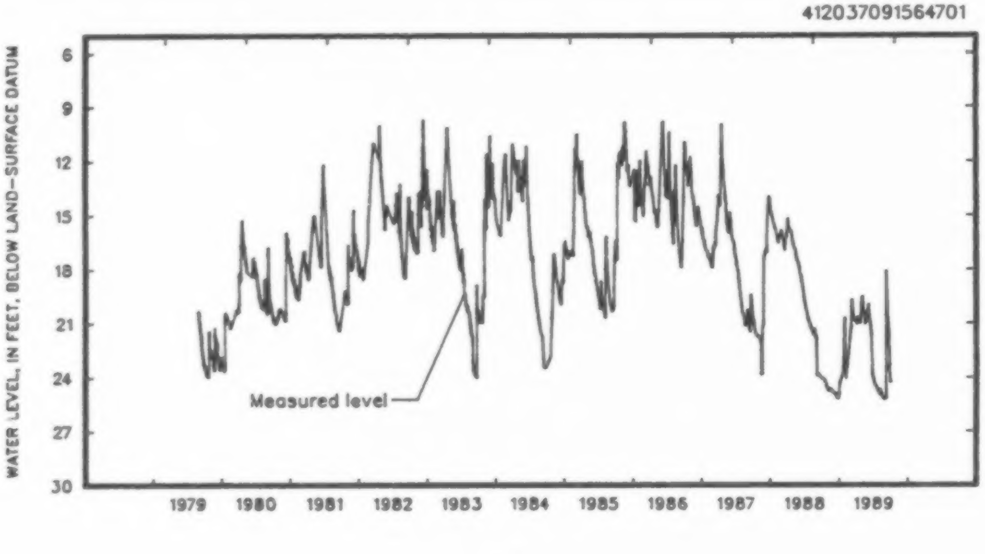
412037091564701. Local number, 76-09-31 CBBC1.
LOCATION.--Lat 41°20'37", long 91°56'47", Hydrologic Unit 07080107, at Pepper Quarry on County Road V-15, 1 mi south of the City of Keota. Owner: River Products Co.
AQUIFER.--Mississippian: in limestone of Mississippian age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 5 in., depth 136 ft, cased to 19 ft, open hole 19-136 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 745 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 2.88 ft above land-surface datum.
REMARKS.--Water levels affected by quarrying operations.
PERIOD OF RECORD.--August 1979 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 9.38 ft below land-surface datum, March 4, 1985; lowest recorded, 25.29 ft below land-surface datum, August 23 and 24, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
NOON VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
05	24.12	24.70	24.92	a24.25	23.99	----	21.00	----	20.01	24.30	24.70	----
10	24.15	24.80	a25.00	----	----	19.76	20.72	20.21	20.71	24.50	24.91	18.15
15	24.21	24.68	a25.00	----	----	20.37	20.92	20.36	21.07	24.56	25.06	20.68
20	24.37	24.81	25.17	a23.75	----	20.81	21.01	21.07	21.58	24.70	25.20	21.42
25	24.57	24.82	25.22	a23.25	----	20.95	21.04	20.45	23.85	24.82	25.27	24.05
EOM	24.69	24.90	a24.90	20.75	----	20.86	20.03	20.84	24.06	24.96	25.19	24.33

WTR YEAR 1989 HIGHEST 16.68 SEP 9, 1989 LOWEST 25.29 AUG 23 AND 24, 1989

a Recorded water level has been adjusted.

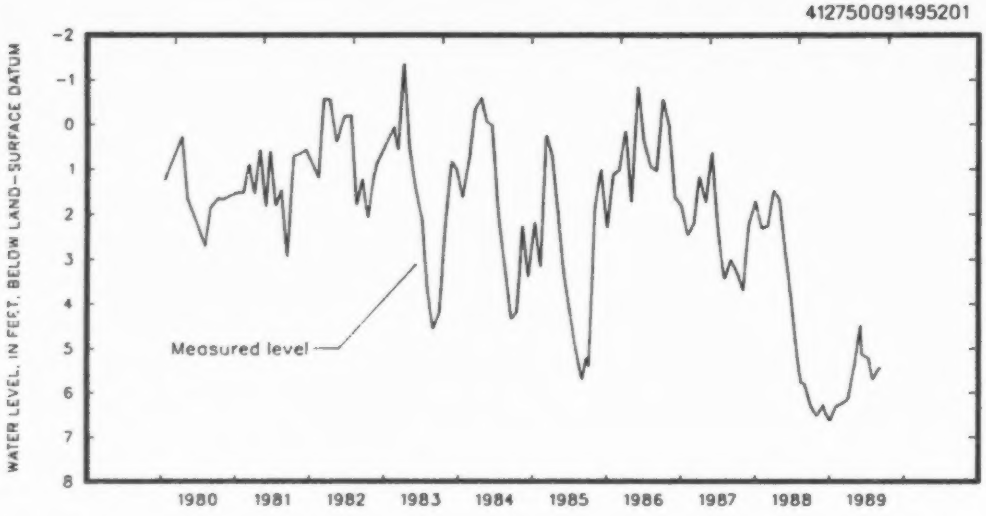


WASHINGTON COUNTY

412750091495201. Local number, 77-09-24 AADA1.
LOCATION.--Lat 41°27'54", long 91°49'47", Hydrologic Unit 07080209, north of the city sewage treatment plant and west of First Avenue SE, Wellman. Owner: City of Wellman.
AQUIFER.--Mississippian: in dolomite of Mississippian age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 8 in., depth 110 ft, cased to 47 ft, open hole 47 to 110 ft.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 695 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Nipple on plate welded to casing, 1.87 ft above land-surface datum.
REMARKS.--City test well No. 1.
PERIOD OF RECORD.--May 1963 to October 1971, May 1973 to current year.
REVISED RECORDS.--WDR IA-84-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.35 ft above land-surface datum, November 3, 1977, March 28, 1979, and April 13, 1983; lowest measured, 6.80 ft below land-surface datum, October 20, 1964.
REVISION.--Lowest water level measured, 6.80 ft below land-surface datum, October 20, 1964.

WATER LEVEL, IN FEET BELOW LAND SURFACE-DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 03	6.30	JAN 04	6.62	MAY 05	5.37	AUG 02	5.69
NOV 01	6.52	FEB 02	6.30	JUN 02	4.48	24	5.49
DEC 02	6.27	MAR 06	6.23	09	5.12	SEP 05	5.43
14	6.46	APR 04	6.13	JUL 13	5.22		



WEBSTER COUNTY

421550094041001. Local number, 86-28-14 ADAB1.
LOCATION.--Lat 42°15'50", long 94°04'10", Hydrologic Unit 07100004, in the town water plant, next to the water tower, Dayton. Owner: Town of Dayton.
AQUIFER.--Devonian and Mississippian: in limestone of Devonian and Mississippian age.
WELL CHARACTERISTICS.--Drilled municipal artesian water well, diameter 13 to 10 in., depth 1,240 ft, cased to 505 ft, 8 in. liner 770-966 ft, open hole 505-770 ft and 966-1,240 ft.
METHOD.--Intermittent measurement with airline by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,121 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Pump base, 0.80 ft above land-surface datum.
REMARKS.--Town well No. 2. Water levels affected by pumping.
PERIOD OF RECORD.--September 1942 to December 1948, January 1952 to November 1971, March 1974 to current year.
REVISIONS.--WRD IA-85-1.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 69.93 ft below land-surface datum, November 17, 1942; lowest measured, 153.20 ft below land-surface datum, February 10, 1987.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

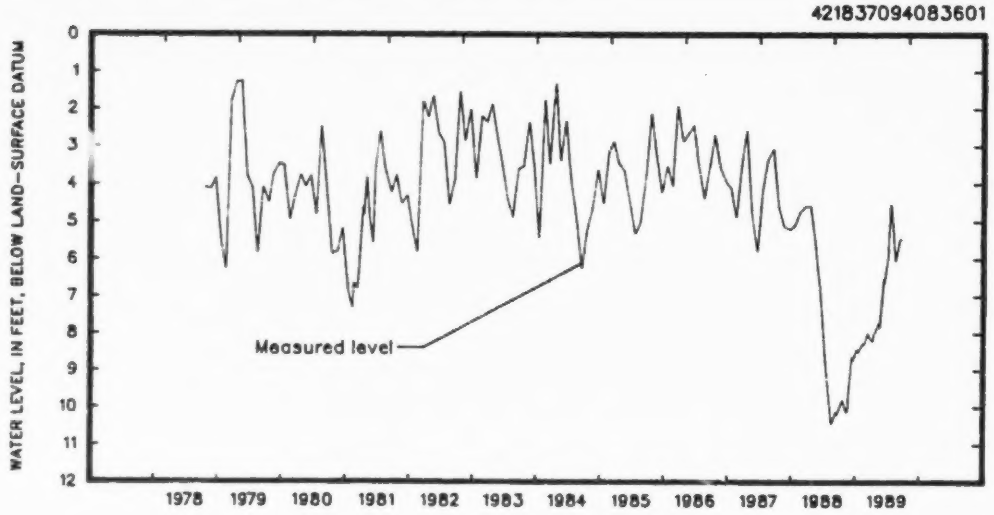
DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 23	127.20	AUG 03	124.20	SEP 14	126.20

WEBSTER COUNTY

421837094083601. Local number, 87-28-29 CCCD1.
LOCATION.--Lat 42°18'37", long 94°08'36", Hydrologic Unit 07100006, 3 mi north and 2 mi east of the Town of Harcourt. Owner: Grace Helms.
AQUIFER.--Glacial drift: in material of Pleistocene age.
WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in., depth 42 ft, lined with tile.
METHOD.--Monthly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.75 ft above land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--October 1942 to June 1956, March 1958 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.05 ft below land-surface datum, August 1, 1972; lowest measured, 13.62 ft below land-surface datum, March 12, 1956.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL
OCT	11	9.94	JAN	20	8.50	APR	21	7.99	JUL	10	5.98
	21	9.81	FEB	15	8.27		27	7.95		24	4.55
NOV	14	10.14		24	8.29	MAY	15	7.72	AUG	14	5.63
	21	10.02	MAR	15	7.99		22	7.85		21	6.05
DEC	16	8.63		21	8.10	JUN	15	6.54	SEP	14	5.48
	21	8.72	APR	12	8.22		20	6.60		21	5.45
JAN	11	8.43									



423018094214701. Local number, 89-30-23 CCBB1.
LOCATION.--Lat 42°30'18", long 94°21'47", Hydrologic Unit 07100004, 75 ft west of the new school addition, Barnum. Owner: Johnson Township Consolidated School.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled unused artesian water well, diameter 4 in., reported depth 208 ft, cased to 208 ft, perforated 203-208 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,174 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing at land-surface datum.
REMARKS.--None.
PERIOD OF RECORD.--October 1942 to September 1945, May 1947 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.36 ft below land-surface datum, October 21, 1942; lowest measured, 45.85 ft below land-surface datum, July 28, 1980.
REVISIONS.--Highest water level measured, 30.36 ft below land-surface datum, October 21, 1942; lowest measured, 45.85 ft below land-surface datum, July 28, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL	DATE		WATER LEVEL
DEC	28	42.97	MAR	22	42.80	JUN	06	43.51	AUG	30	43.78

WOODBURY COUNTY

422058095573701. Local number, 87-44-15 CBBB1.
LOCATION.--Lat 42°20'58", long 95°57'37", Hydrologic Unit 10230003, approximately 3.5 mi west and 5.5 mi north of the Village of Oto. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 197 ft, cased to 197 ft, perforated 185-189 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,165 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 1.50 ft above land-surface datum.
REMARKS.--Well D-34.
PERIOD OF RECORD.--April 1980 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 54.21 ft below land-surface datum, January 11, 1988; lowest measured, 63.56 ft below land-surface datum, November 2, 1982.

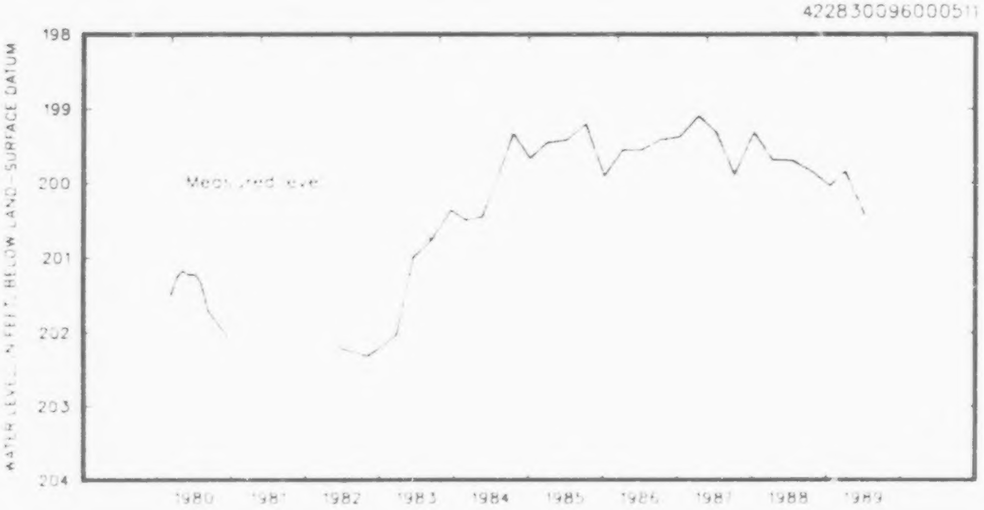
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	57.14	JAN 19	57.66	APR 03	57.60	JUL 07	58.63

422830096000511. Local number, 88-44-16 BAAB11.
LOCATION.--Lat 42°28'30", long 96°00'05", Hydrologic Unit 10230004, approximately 3 mi east and 0.5 mi south of the Town of Moville. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 337 ft, cased to 337 ft, perforated 332-337 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,340 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.50 ft above land-surface datum.
REMARKS.--Well D-33.
PERIOD OF RECORD.--October 1979 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 199.09 ft below land-surface datum, April 13, 1987; lowest measured, 202.90 ft below land-surface datum, October 17, 1979.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	199.84	JAN 19	200.04	APR 03	199.84	JUL 05	200.42

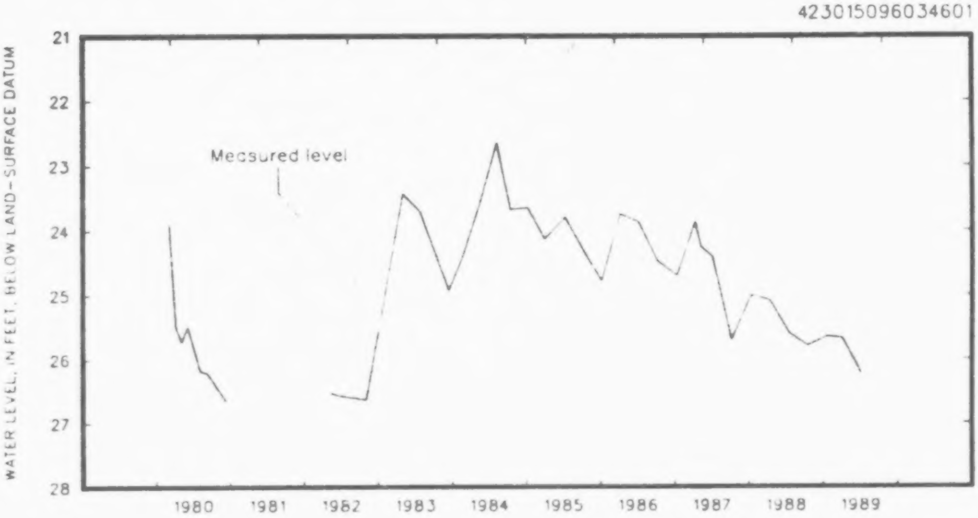


WOODBURY COUNTY

423015096034601. Local number, 89-44-20 DCDC1.
LOCATION.--Lat 42°30'15", long 96°03'46", Hydrologic Unit 10230004, east of Iowa Highway 140, approximately 1 mi north of the Town of Moville. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 221 ft, cased to 221 ft, perforated 206-221 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,168 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 4.00 ft above land-surface datum.
REMARKS.--Well D-32.
PERIOD OF RECORD.--October 1979 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.64 ft below land-surface datum, August 8, 1984; lowest measured, 26.65 ft below land-surface datum, December 11, 1980.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	25.79	JAN 19	25.64	APR 03	25.67	JUL 05	26.22



422910096135811. Local number, 89-46-36 BBDC11.
LOCATION.--Lat 42°29'10", long 96°13'58", Hydrologic Unit 10230004, approximately 0.75 mi northeast of the Eberly Cemetery or 2.5 mi west and 0.75 mi north of the Village of Lawton. Owner: Geological Survey Bureau, DNR and U.S. Geological Survey.
AQUIFER.--Dakota: in sandstone of Cretaceous age.
WELL CHARACTERISTICS.--Drilled observation artesian water well, diameter 2 in., depth 500 ft, cased to 500 ft, perforated 358-362 ft.
METHOD.--Quarterly measurement with chalked tape by USGS personnel.
DATUM.--Elevation of land-surface datum is 1,268 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 3.00 ft above land-surface datum.
REMARKS.--Well D-30.
PERIOD OF RECORD.--April 1980 to December 1980, May 1982 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 128.32 ft below land-surface datum, July 8, 1987; lowest measured, 135.35 ft below land-surface datum, November 2, 1982.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 17	130.83	JAN 19	130.82	APR 03	130.97	JUL 05	131.65

GROUND-WATER-QUALITY DATA

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
ADAIR COUNTY 412852094275101 07731W07CAAB 1977MENLO 3 (LAT 41 28 52N LONG 094 27 51W)										
MAY 1989 23...	1145	111ALVM	10	--	12.0	520	7.70	240	75	12
AUG 03...	1415	111ALVM	12	480	14.0	500	7.30	--	--	--
AUDUBON COUNTY 413234094552401 07835W19BCDB 1976BRAYTON 1 (LAT 41 32 34N LONG 094 55 24W)										
AUG 1989 24...	0845	111ENRV	55	30	12.0	960	7.00	390	100	33
413537094532701 07835W04BCBD 1969EXIRA 11 (LAT 41 35 37N LONG 094 53 27W)										
MAY 1989 31...	1100	111ENRV	165	30	13.0	690	7.25	330	94	23
JUL 14...	1145	111ENRV	140	30	15.5	640	7.15	--	--	--
SEP 28...	1025	111ENRV	140	20	15.0	720	7.15	--	--	--
BLACK HAWK COUNTY 421857092115601 08712W25CBCD 1961LA PORTE CITY 3 (LAT 42 18 57N LONG 092 11 56W)										
JUL 1989 24...	0930	350SLRN	90	60	11.0	--	7.23	--	--	--
422801092152801 08812W04BBBC 12372 1960ELK RUN HEIGHTS 1 (LAT 42 28 01N LONG 092 15 28W)										
AUG 1989 09...	0900	344CDVL	--	20	12.0	500	7.43	280	78	21
423042092265801 08914W24BBAA 1961CEDAR FALLS 5 (LAT 42 30 42N LONG 092 26 58W)										
MAY 1989 24...	0800	344CDVL	2400	60	12.0	560	7.50	280	81	20
AUG 08...	0915	344CDVL	2000	25	11.0	630	7.19	--	--	--
BREMER COUNTY 423902092272501 09114W35ADD 11754 1959JA JANESVILLE 2 (LAT 42 39 02N LONG 092 27 25W)										
MAY 1989 24...	1530	350SLRN	100	20	12.0	430	7.10	250	65	21
AUG 08...	1030	350SLRN	100	30	12.0	500	6.99	--	--	--
424319092283401 09114W03CABB 1967WAVERLY 5 (LAT 42 43 19N LONG 092 28 34W)										
MAY 1989 24...	0930	340DVSL	1560	20	11.0	590	7.01	280	75	23
AUG 08...	1130	340DVSL	1400	60	11.0	610	6.63	--	--	--
425058092315601 09314W20CC 11138 1959PLAINFIELD 1 (LAT 42 50 58N LONG 092 31 56W)										
JUL 1989 25...	1415	344DVNNM	175	15	10.5	--	7.04	220	64	15
BUCHANAN COUNTY 422833091431701 08908W36DCAA 25801 1980WINTHROP 3 (LAT 42 28 33N LONG 091 43 17W)										
AUG 1989 18...	1130	340DVSL	290	20	10.0	760	7.50	340	74	37
423710091540001 09009W10CBA 06208 1953HAZLETON 1 (LAT 42 37 10N LONG 091 54 00W)										
JUN 1989 01...	1330	350SLRN	50	15	12.0	514	7.26	280	66	27
AUG 01...	1200	350SLRN	)	20	11.0	510	7.26	--		

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
ADAIR COUNTY										
412852094275101 07731W07CAAB 1977MENLO 3 (LAT 41 28 52N LONG 094 27 51W)										
MAY 1989										
23...	15	0.70	--	12	32	0.25	26	306	1.70	<0.100
AUG										
03...	--	--	--	--	--	--	--	--	1.70	<0.100
AUDUBON COUNTY										
413234094552401 07835W19BCDB 1976BRAYTON 1 (LAT 41 32 34N LONG 094 55 24W)										
AUG 1989										
24...	23	1.2	302	41	110	0.35	19	--	0.100	0.100
413537094532701 07835W04BCBD 1969EXIRA 11 (LAT 41 35 37N LONG 094 53 27W)										
MAY 1989										
31...	21	5.6	232	35	71	0.25	15	416	1.10	0.300
JUL										
14...	--	--	--	--	--	--	--	--	2.40	0.200
SEP										
28...	--	--	--	--	--	--	--	--	3.50	<0.100
BLACK HAWK COUNTY										
421857092115601 08712W25CBCD 1961LA PORTE CITY 3 (LAT 42 18 57N LONG 092 11 56W)										
JUL 1989										
24...	--	--	--	0.50	--	1.3	7.0	366	0.100	1.50
422801092152801 08812W04BBBC 12372 1960ELK RUN HEIGHTS 1 (LAT 42 28 01N LONG 092 15 28W)										
AUG 1989										
09...	14	2.0	--	28	44	0.15	18	290	3.50	<0.100
423042092265801 08914W24BEAA 1961CEDAR FALLS 5 (LAT 42 30 42N LONG 092 26 58W)										
MAY 1989										
24...	13	1.8	--	28	36	0.20	12	324	3.60	<0.100
AUG										
08...	--	--	220	--	--	--	--	--	3.30	<0.100
BREMER COUNTY										
423902092272501 09114W35ADD 11754 1959JANESVILLE 2 (LAT 42 39 02N LONG 092 27 25W)										
MAY 1989										
24...	5.0	1.0	--	10	21	0.15	13	264	9.10	<0.100
AUG										
08...	--	--	201	--	--	--	--	--	3.60	<0.100
424319092283401 09114W03CABB 1967WAVERLY 5 (LAT 42 43 19N LONG 092 28 34W)										
MAY 1989										
24...	9.2	1.1	--	16	26	0.15	14	334	6.70	<0.100
AUG										
08...	--	--	247	--	--	--	--	--	6.30	<0.100
425058092315601 09314W20CC 11138 1959PLAINFIELD 1 (LAT 42 50 58N LONG 092 31 56W)										
JUL 1989										
25...	10	1.2	--	14	22	0.15	12	274	6.60	<0.100
BUCHANAN COUNTY										
422833091431701 08908W36DCAA 25801 1980WINTHROP 3 (LAT 42 28 33N LONG 091 43 17W)										
AUG 1989										
18...	24	4.1	320	1.0	90	0.40	11	436	<0.100	3.00
423710091540001 09009W10CBA 06208 1953HAZLETON 1 (LAT 42 37 10N LONG 091 54 00W)										
JUN 1989										
01...	4.4	1.1	--	14	20	0.10	14	238	8.90	<0.100
AUG										
01...	--	--	--	--	--	--	--	--	9.70	<0.100

[Pesticide concentrations expressed as total recoverable]

DATE	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ATRA-ZINE, TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	METRI-BUZIN IN WHOLE WATER (UG/L) (81408)	ALA-CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA-CHLOR IN WHOLE WATER (UG/L) (39356)	BUTY-LATE (UG/L) (99901)	TRI-FLURA-LIN TOTAL RECOVER (UG/L) (39030)
ADAIR COUNTY										
412852094275101 07731W07CAAB 1977MENLO 3 (LAT 41 28 52N LONG 094 27 51W)										
MAY 1989										
23...	0.300	50	<20	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG										
03...	0.200	--	--	0.16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUDUBON COUNTY										
413234094552401 07835W19BCDB 1976BRAYTON 1 (LAT 41 32 34N LONG 094 55 24W)										
AUG 1989										
24...	<0.100	7000	1000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413537094532701 07835W04BCBD 1969EXIRA 11 (LAT 41 35 37N LONG 094 53 27W)										
MAY 1989										
31...	<0.100	90	760	0.43	0.89	<0.10	<0.10	0.47	<0.10	<0.10
JUL										
14...	<0.100	--	--	2.0	1.1	<0.10	<0.10	0.88	<0.10	<0.10
SEP										
28...	<0.100	--	--	0.69	0.37	<0.10	<0.10	<0.10	<0.10	<0.10
BLACK HAWK COUNTY										
421857092115601 08712W25CBCD 1961LA PORTE CITY 3 (LAT 42 18 57N LONG 092 11 56W)										
JUL 1989										
24...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422801092152801 08812W04BBBC 12372 1960ELK RUN HEIGHTS 1 (LAT 42 28 01N LONG 092 15 28W)										
AUG 1989										
09...	<0.100	30	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423042092265801 08914W24BBAA 1961CEDAR FALLS 5 (LAT 42 30 42N LONG 092 26 58W)										
MAY 1989										
24...	<0.100	<20	<20	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG										
08...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
BREMER COUNTY										
423902092272501 09114W35ADD 11754 1959JANESVILLE 2 (LAT 42 39 02N LONG 092 27 25W)										
MAY 1989										
24...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG										
08...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424319092283401 09114W03CABB 1967WAVERLY 5 (LAT 42 43 19N LONG 092 28 34W)										
MAY 1989										
24...	<0.100	<20	<20	0.23	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG										
08...	<0.100	--	--	0.19	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425058092315601 09314W20CC 11138 1959PLAINFIELD 1 (LAT 42 50 58N LONG 092 31 56W)										
JUL 1989										
25...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
BUCHANAN COUNTY										
422833091431701 08908W36DCAA 25801 1980WINTHROP 3 (LAT 42 28 33N LONG 091 43 17W)										
AUG 1989										
18...	<0.100	1000	40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423710091540001 09009W10CBA 06208 1953HAZLETON 1 (LAT 42 37 10N LONG 091 54 00W)										
JUN 1989										
01...	0.200	<20	<20	0.36	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG										
01...	<0.100	--	--	0.32	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
BUCHANAN COUNTY 423807092032601 09010W05BCDD 1977FAIRBANK 4 (LAT 42 38 07N LONG 092 03 26W)										
JUL 1989 20...	1430	344CDVL	98	20	10.0	340	7.05	250	69	20
BUENA VISTA COUNTY 425144094590401 09335W21BADC 1959MARATHON 1 (LAT 42 51 44N LONG 094 59 04W)										
AUG 1989 01...	1500	110QRNR	110	60	15.5	1250	6.98	490	130	39
BUTLER COUNTY 423401092373601 09015W33BCA 07854 1956NEW HARTFORD 2 (LAT 42 34 01N LONG 092 37 36W)										
AUG 1989 08...	1300	344CLVL	100	5	11.0	458	7.85	240	64	20
423512092521001 09017W29AAAA 1962APLINGTON 2 (LAT 42 35 12N LONG 092 52 10W)										
AUG 1989 08...	1505	341LMCK	--	60	10.5	670	7.70	300	69	31
CALHOUN COUNTY 421615094440701 08633W07DCBB 1972LAKE CITY 3 (LAT 42 16 15N LONG 094 44 07W)										
JUL 1989 28...	1245	217DKOT	430	20	14.0	1200	7.20	560	150	44
CARROLL COUNTY 415435094492801 08234W17DDBA 21882 1969DEDHAM 4 (LAT 41 54 35N LONG 094 49 28W)										
AUG 1989 02...	1130	111SRRV	45	30	14.0	650	7.50	320	89	24
420733094465301 08534W35CCCB 08006 1956LIDDERDALE 2 (LAT 42 07 33N LONG 094 46 53W)										
AUG 1989 02...	1430	217DKOT	25	60	16.0	690	6.90	360	98	27
CASS COUNTY 411818095045801 07537W10DDBD 1916LEWIS 1 (LAT 41 18 18N LONG 095 04 58W)										
MAY 1989 31...	1400	112PLSC	110	30	12.5	785	6.80	400	100	36
JUL 14...	1400	112PLSC	110	30	13.0	820	6.80	--	--	--
SEP 28...	1330	112PLSC	110	20	12.5	800	6.82	--	--	--
412706095065501 07737W21CBDB 1959MARNE 3 (LAT 41 27 06N LONG 095 06 55W)										
MAY 1989 31...	1245	111HLCN	3.0	45	13.0	1240	6.70	690	170	65
JUL 14...	1250	111HLCN	3.5	30	13.0	1200	6.70	--	--	--
SEP 28...	1210	111HLCN	3.5	20	11.0	1180	6.80	--	--	--
412714094460701 07735W21BDDD 1960ANITA 3 (LAT 41 27 14N LONG 094 46 07W)										
AUG 1989 24...	1000	217DKOT	90	30	12.0	625	7.30	260	71	21
CHEROKEE COUNTY 424847095430001 09241W05CBDA 1976CLEGHORN 2 (LAT 42 48 47N LONG 095 43 00W)										
AUG 1989 09...	0830	217DKOT	60	30	13.0	1380	7.45	550	150	43
CHICKASAW COUNTY 424725092322801 09414W18CAAD 1979NASHUA 4 (LAT 42 47 25N LONG 092 32 28W)										
MAY 1989 24...	1100	340DVNN	450	20	10.0	670	7.10	320	86	25
JUL 25...	1315	340DVNN	--	--	10.0	--	6.80	--	--	--

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
BUCHANAN COUNTY										
423807092032601 09010W05BCDD 1977FAIRBANK 4 (LAT 42 38 07N LONG 092 03 26W)										
JUL 1989 20...	9.5	2.5	--	2.0	20	0.75	8.9	304	<0.100	0.200
BUENA VISTA COUNTY										
425144094590401 09335W21BADC 1959MARATHON 1 (LAT 42 51 44N LONG 094 59 04W)										
AUG 1989 01...	47	5.2	389	2.5	190	0.30	31	676	<0.100	0.500
BUTLER COUNTY										
423401092373601 09015W33BCA 07854 1956NEW HARTFORD 2 (LAT 42 34 01N LONG 092 37 36W)										
AUG 1989 08...	7.5	1.3	--	15	21	0.70	13	280	<0.100	0.400
423512092521001 09017W29AAAA 1962APLINGTON 2 (LAT 42 35 12N LONG 092 52 10W)										
AUG 1989 08...	30	4.5	290	2.0	73	0.45	15	358	<0.100	2.50
CALHOUN COUNTY										
421615094440701 08633W07DCBB 1972LAKE CITY 3 (LAT 42 16 15N LONG 094 44 07W)										
JUL 1989 28...	42	5.1	456	5.0	170	0.30	20	710	<0.100	1.00
CARROLL COUNTY										
415435094492801 08234W17DDBA 21882 1969DEDHAM 4 (LAT 41 54 35N LONG 094 49 28W)										
AUG 1989 02...	12	1.2	262	17	47	0.30	19	328	<0.100	<0.040
420733094465301 08534W35CCCB 08006 1956LIDDERDALE 2 (LAT 42 07 33N LONG 094 46 53W)										
AUG 1989 02...	10	4.0	370	1.5	20	0.35	20	422	<0.100	1.20
CASS COUNTY										
411818095045801 07537W10DDBD 1916LEWIS 1 (LAT 41 18 18N LONG 095 04 58W)										
MAY 1989 31...	12	1.4	202	40	58	0.20	21	482	20.0	<0.100
JUL 14...	--	--	--	--	--	--	--	--	20.0	<0.100
SEP 28...	--	--	--	--	--	--	--	--	20.0	<0.100
412706095065501 07737W21CBDB 1959MARNE 3 (LAT 41 27 06N LONG 095 06 55W)										
MAY 1989 31...	15	1.9	268	88	150	0.25	23	840	26.0	<0.100
JUL 14...	--	--	--	--	--	--	--	--	23.0	<0.100
SEP 28...	--	--	--	--	--	--	--	--	22.0	<0.100
41271 094460701 07735W21BDDD 1960ANITA 3 (LAT 41 27 14N LONG 094 46 07W)										
AUG 1989 24...	24	2.8	258	<0.50	71	0.50	21	--	<0.100	0.500
CHEROKEE COUNTY										
424847095430001 09241W05CBDA 1976CLEGHORN 2 (LAT 42 48 47N LONG 095 43 00W)										
AUG 1989 09...	110	9.3	317	7.5	450	1.2	19	--	<0.100	1.20
CHICKASAW COUNTY										
424725092322801 09414W18CAAD 1979NASHUA 4 (LAT 42 47 25N LONG 092 32 28W)										
MAY 1989 24...	16	1.8	--	28	33	0.15	15	378	1.20	0.200
JUL 25...	--	--	294	--	--	--	--	--	0.800	<0.100

[Pesticide concentrations expressed as total recoverable]

DATE	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ATRA-ZINE, TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	METRI-BUZIN IN WHOLE WATER (UG/L) (81408)	ALA-CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA-CHLOR IN WHOLE WATER (UG/L) (39356)	BUTY-LATE (UG/L) (99901)	TRI-FLURA-LIN TOTAL RECOVER (UG/L) (39030)
BUCHANAN COUNTY										
423807092032601 09010W05BCDD 1977FAIRBANK 4 (LAT 42 38 07N LONG 092 03 26W)										
JUL 1989 20...	<0.100	200	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
BUENA VISTA COUNTY										
425144094590401 09335W21BADC 1959MARATHON 1 (LAT 42 51 44N LONG 094 59 04W)										
AUG 1989 01...	0.100	1400	420	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
BUTLER COUNTY										
423401092373601 09015W33BCA 07854 1956NEW HARTFORD 2 (LAT 42 34 01N LONG 092 37 36W)										
AUG 1989 08...	<0.100	480	120	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423512092521001 09017W29AAAA 1962APLINGTON 2 (LAT 42 35 12N LONG 092 52 10W)										
AUG 1989 08...	<0.100	770	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
CALHOUN COUNTY										
421615094440701 08633W07DCBB 1972LAKE CITY 3 (LAT 42 16 15N LONG 094 44 07W)										
JUL 1989 28...	<0.100	80	1200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
CARROLL COUNTY										
415435094492801 08234W17DDBA 21882 1969DEDHAM 4 (LAT 41 54 35N LONG 094 49 28W)										
AUG 1989 02...	0.120	<6	<2	0.13	0.14	<0.10	<0.10	<0.10	<0.10	<0.10
420733094465301 08534W35CCCB 08006 1956LIDDERDALE 2 (LAT 42 07 33N LONG 094 46 53W)										
AUG 1989 02...	<0.100	470	460	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
CASS COUNTY										
411818095045801 07537W10DDBD 1916LEWIS 1 (LAT 41 18 18N LONG 095 04 58W)										
MAY 1989 31...	<0.100	<20	30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 14...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 28...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412706095065501 07737W21CBDB 1959MARNE 3 (LAT 41 27 06N LONG 095 06 55W)										
MAY 1989 31...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 14...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 28...	<0.100	--	--	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412714094460701 07735W21BDDD 1960ANITA 3 (LAT 41 27 14N LONG 094 46 07W)										
AUG 1989 24...	<0.100	70	460	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
CHEROKEE COUNTY										
424847095430001 09241W05CBDA 1976CLEGHORN 2 (LAT 42 48 47N LONG 095 43 00W)										
AUG 1989 09...	0.100	<20	140	--	--	--	--	--	--	--
CHICKASAW COUNTY										
424725092322801 09414W18CAAD 1979NASHUA 4 (LAT 42 47 25N LONG 092 32 28W)										
MAY 1989 24...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 25...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
CHICKASAW COUNTY 430211092270701 09514W24BBAC 04872 1950IONIA 1 (LAT 43 02 11N LONG 092 27 07W)										
JUL 1989 24...	1145	350SLRN	120	5	11.5	--	7.27	260	67	22
CLAY COUNTY 425508095204001 09438W33BLD 07470 1955PETERSON 2 (LAT 42 55 08N LONG 095 20 40W)										
AUG 1989 01...	1100	112NBRK	133	30	15.0	1090	--	480	130	38
430105095022101 09536W25ACDD 1975GILLETT GROVE 1 (LAT 43 01 05N LONG 095 02 21W)										
AUG 1989 01...	1300	112PLSC	35	60	15.5	890	7.10	460	130	33
430922095193501 09638W03CCDD 1976EVERLY 3 (LAT 43 09 22N LONG 095 19 35W)										
MAY 1989 25...	0800	111ALVM	230	30	9.0	890	7.40	410	110	34
JUL 19...	0840	111ALVM	230	30	12.0	910	7.25	--	--	--
SEP 18...	1645	111ALVM	230	20	14.5	1020	7.24	--	--	--
CLAYTON COUNTY 423842091242501 09105W35CCC 02714 1946EDGEWOOD 1 (LAT 42 38 42N LONG 091 24 25W)										
JUL 1989 20...	1100	350SLRN	125	20	10.0	450	7.40	270	73	22
424820091324002 09206W03CC 1985VOLGA 2 (LAT 42 48 20N LONG 091 32 40W)										
JUL 1989 19...	1100	364GLEN	195	20	13.0	500	7.40	310	72	32
425138091234901 09305W23ABBB 18420 1965ELKADER 5 (LAT 42 51 38N LONG 091 23 49W)										
JUL 1989 20...	0900	364STPR	300	20	14.0	560	7.37	280	64	29
430130091103001 09503W22DD 05311 1952MCGREGOR 6 (LAT 43 01 30N LONG 091 10 30W)										
JUL 1989 19...	1600	371SLRC	275	20	10.0	610	6.93	310	75	29
CLINTON COUNTY 414729090151801 08106E27CBC 22806 1971CAMANCHE 3 (LAT 41 47 29N LONG 090 15 18W)										
JUN 1989 02...	0930	112PLSC	210	20	13.0	360	7.11	150	35	14
JUL 18...	1100	112PLSC	210	20	13.0	325	7.40	--	--	--
SEP 22...	1100	112PLSC	210	20	13.0	320	7.30	--	--	--
415753090490411 08301E26CBDC 1963LOST NATION 2 (LAT 41 57 53N LONG 090 49 04W)										
JUN 1989 02...	1400	350SLRN	300	10	13.0	720	7.58	390	93	39
JUL 17...	1245	350SLRN	300	15	15.0	750	7.22	--	--	--
CRAWFORD COUNTY 420736095342401 08541W36CCBC 1931RICKETTS 2 (LAT 42 07 36N LONG 095 34 28W)										
MAY 1989 24...	1100	111SDRV	85	20	11.5	920	7.30	420	110	36
JUL 18...	1030	111SDRV	85	15	11.5	890	7.20	--	--	--
SEP 18...	1000	111SDRV	85	15	11.0	860	7.28	--	--	--

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
CHICKASAW COUNTY										
430211092270701 09514W24BBAC 04872 1950IONIA 1 (LAT 43 02 11N LONG 092 27 07W)										
JUL 1989										
24...	22	2.4	--	1.0	--	0.85	12	302	<0.100	2.00
CLAY COUNTY										
425508095204001 09438W33BLD 07470 1955PETERSON 2 (LAT 42 55 08N LONG 095 20 40W)										
AUG 1989										
01...	20	4.0	356	42	120	0.30	38	698	--	2.00
430105095022101 09536W25ACDD 1975GILLETT GROVE 1 (LAT 43 01 05N LONG 095 02 21W)										
AUG 1989										
01...	11	1.6	366	36	56	0.35	25	542	3.50	<0.100
430922095193501 09638W03CCDD 1976EVERLY 3 (LAT 43 09 22N LONG 095 19 35W)										
MAY 1989										
25...	15	6.5	296	58	50	0.20	25	516	9.50	0.200
JUL										
19...	--	--	--	--	--	--	--	--	9.20	0.200
SEP										
18...	--	--	--	--	--	--	--	--	9.50	0.100
CLAYTON COUNTY										
423842091242501 09105W35CCC 02714 1946EDGEWOOD 1 (LAT 42 38 42N LONG 091 24 25W)										
JUL 1989										
20...	10	1.4	--	2.0	32	0.25	15	214	<0.100	0.100
424820091324002 09206W03CC 1985VOLGA 2 (LAT 42 48 20N LONG 091 32 40W)										
JUL 1989										
19...	7.3	1.6	--	9.5	36	0.30	13	268	5.00	<0.100
425138091234901 09305W23ABBB 18420 1965ELKADER 5 (LAT 42 51 38N LONG 091 23 49W)										
JUL 1989										
20...	11	4.6	--	4.5	62	0.95	8.0	208	0.100	<0.100
430130091103001 09503W22DD 05311 1952MCGREGOR 6 (LAT 43 01 30N LONG 091 10 30W)										
JUL 1989										
19...	30	2.6		32	36	0.15	12	400	2.20	<0.100
CLINTON COUNTY										
414729090151801 08106E27CBC 22806 1971CAMANCHE 3 (LAT 41 47 29N LONG 090 15 18W)										
JUN 1989										
02...	10	1.0		22	22	<0.10	22	164	9.00	<0.100
JUL										
18...									9.20	<0.100
SEP										
22...									8.50	<0.100
415753090490411 08301E26CBDC 1963LOST NATION 2 (LAT 41 57 53N LONG 090 49 04W)										
JUN 1989										
02...	18	2.0		34	30	0.25	14	394	1.60	<0.100
JUL										
17...									2.60	<0.100
CRAWFORD COUNTY										
420736095342401 08541W36CCBC 1931RICKETTS 2 (LAT 42 07 36N LONG 095 34 28W)										
MAY 1989										
24...	12	3.1	354	30	76	0.35	22	554	1.80	<0.100
JUL										
18...									1.90	<0.100
SEP										
18...									2.30	<0.100

DATE	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ATRA-ZINE, TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	METRI-BUZIN IN WHOLE WATER (UG/L) (81408)	ALA-CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA-CHLOR IN WHOLE WATER (UG/L) (39356)	BUTY-LATE (UG/L) (99901)	TRI-FLURA-LIN TOTAL RECOVER (UG/L) (39030)
				[Pesticide concentrations expressed as total recoverable]						
CHICKASAW COUNTY										
430211092270701 09514W24BBAC 04872 1950IONIA 1 (LAT 43 02 11N LONG 092 27 07W)										
JUL 1989 24...	<0.100	820	<20	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
CLAY COUNTY										
425508095204001 09438W33BLD 07470 1955PETERSON 2 (LAT 42 55 08N LONG 095 20 40W)										
AUG 1989 01...	0.100	500	610	0.13	0.25	<0.10	0.10	<0.10	<0.10	<0.10
430105095022101 09536W25ACDD 1975GILLETT GROVE 1 (LAT 43 01 05N LONG 095 02 21W)										
AUG 1989 01...	<0.100	<20	<20	0.40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430922095193501 09638W03CCDD 1976EVERLY 3 (LAT 43 09 22N LONG 095 19 35W)										
MAY 1989 25...	<0.100	<20	<20	3.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 19	<0.100	--	--	2.4	<0.10	<0.10	<0.10	0.26	<0.10	<0.10
SEP 18	<0.100	--	--	2.3	<0.10	<0.10	<0.10	0.13	<0.10	<0.10
CLAYTON COUNTY										
423842091242501 09105W35CCC 02714 1946EDGEWOOD 1 (LAT 42 38 42N LONG 091 24 25W)										
JUL 1989 20	<0.100	1900	30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424820091324002 09206W03CC 1985VOLGA 2 (LAT 42 48 20N LONG 091 32 40W)										
JUL 1989 19	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425138091234901 09305W23ABBB 18420 1965ELKADER 5 (LAT 42 51 38N LONG 091 23 49W)										
JUL 1989 20	<0.100	20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430130091103001 09503W22DD 05311 1952MCGREGOR 6 (LAT 43 01 30N LONG 091 10 30W)										
JUL 1989 19	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
CLINTON COUNTY										
414729090151801 08106E27CBC 22806 1971CAMANCHE 3 (LAT 41 47 29N LONG 090 15 18W)										
JUN 1989 02	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 18	<0.100			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 22	<0.100			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415753090490411 08301E26CBDC 1963LOST NATION 2 (LAT 41 57 53N LONG 090 49 04W)										
JUN 1989 02	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 17	<0.100			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
CRAWFORD COUNTY										
420736095342401 08541W36CCBC 1931RICKETTS 2 (LAT 42 07 36N LONG 095 34 28W)										
MAY 1989 24	0.100	510	360	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 18	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 18	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
CRAWFORD COUNTY										
421004095272701 08540W13CCCC 1925SCHLESWIG 3 (LAT 42 10 04N LONG 095 27 27W)										
AUG 1989 17...	1130	111ALVM	110	30	11.0	870	7.20	440	120	35
DALLAS COUNTY										
414130094021501 08027W31CDAA 1976DALLAS CENTER 4 (LAT 41 41 30N LONG 094 02 15W)										
MAY 1989 22...	1600	111ALVM	140	15	12.0	722	7.20	--	--	--
AUG 04...	1215	111ALVM	150	30	13.0	745	7.20	--	--	--
415055094131202 08129W10BBBA 1969DAWSON 2 (LAT 41 50 55N LONG 094 13 12W)										
MAY 1989 23...	0845	111ALVM	40	15	11.0	670	7.40	--	--	--
AUG 04...	1100	111ALVM	85	20	12.5	650	7.30	--	--	--
DELAWARE COUNTY										
422834091281601 08905W31DAAB 1970MANCHESTER 6 (LAT 42 28 34N LONG 091 28 16W)										
JUN 1989 01...	1045	350SLRN	600	20	11.0	568	7.50	290	72	26
JUL 20...	1300	350SLRN	600	20	11.0	490	7.37	--	--	--
SEP 14...	1000	350SLRN	760	15	10.0	480	7.42	--	--	--
DES MOINES COUNTY										
410015091093401 07203W25CBCC 24057 1976MEDIAPOLIS 4 (LAT 41 00 15N LONG 091 09 34W)										
JUL 1989 25...	0730	330MDVU	40	10	12.5	675	7.47	330	82	30
DUBUQUE COUNTY										
422705090561201 08801W11CABB 1978EPWORTH 3 (LAT 42 27 05N LONG 090 56 12W)										
JUL 1989 18...	1530	358ALXD	150	20	12.0	820	7.00	380	95	35
422910091072701 08902W30DCCC 1959DYERSVILLE 1 (LAT 42 29 10N LONG 091 07 27W)										
JUN 1989 01...	0915	350SLRN	700	5	13.0	1100	6.69	470	110	47
JUL 18...	1600	350SLRN	425	20	14.0	1100	7.25	--	--	--
423305091064901 08902W05CBBB 1898NEW VIENNA 1 (LAT 42 33 05N LONG 091 06 49W)										
JUN 1989 01...	0745	350SLRN	50	10	11.0	630	7.35	360	86	36
JUL 19...	0800	350SLRN	--	20	10.0	720	7.16	--	--	--
SEP 14...	1230	350SLRN	50	20	11.0	710	7.10	--	--	--
FAYETTE COUNTY										
430010091390102 09507W34ACAD 1924CLERMONT 2 (LAT 43 00 10N LONG 091 39 10W)										
JUL 1989 19...	1300	364GLEN	100	20	10.0	750	6.42	350	89	32
FLOYD COUNTY										
425754092515201 09417W16BBAA 1926MARBLE ROCK 1 (LAT 42 57 54N LONG 092 51 52W)										
JUL 1989 25...	1130	344CDVL	194	15	10.0	--	7.13	230	68	15
FRANKLIN COUNTY										
425341093132501 09320W05DDD 1956SHEFFIELD 2 (LAT 42 53 41N LONG 093 13 25W)										
MAY 1989 23...	1345	110QRNR	45	20	10.0	614	7.28	290	74	26
AUG 01...	1230	110QRNR	40	20	12.0	620	7.20	--	--	--

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
CRAWFORD COUNTY 421004095272701 08540W13CCCC 1925SCHLESWIG 3 (LAT 42 10 04N LONG 095 27 27W)										
AUG 1989 17...	14	4.6	336	31	68	0.40	22	--	8.70	<0.100
DALLAS COUNTY 414130094021501 08027W31CDAA 1976DALLAS CENTER 4 (LAT 41 41 30N LONG 094 02 15W)										
MAY 1989 22...	--	--	--	--	--	--	--	--	3.50	<0.100
AUG 04...	--	--	--	--	--	--	--	--	3.10	<0.100
415055094131202 08129W10BBBA 1969DAWSON 2 (LAT 41 50 55N LONG 094 13 12W)										
MAY 1989 23...	--	--	--	--	--	--	--	--	9.70	<0.100
AUG 04...	--	--	--	--	--	--	--	--	9.70	<0.100
DELAWARE COUNTY 422834091281601 08905W31DAAB 1970MANCHESTER 6 (LAT 42 28 34N LONG 091 28 16W)										
JUN 1989 01...	6.9	0.80	--	15	38	0.10	13	284	11.0	<0.100
JUL 20...	--	--	--	--	--	--	--	--	13.0	<0.100
SEP 14...	--	--	--	--	--	--	--	--	12.0	<0.100
DES MOINES COUNTY 410015091093401 07203W25CBCC 24057 1976MEDIAPOLIS 4 (LAT 41 00 15N LONG 091 09 34W)										
JUL 1989 25...	34	1.1	--	2.0	27	0.55	13	372	<0.100	1.50
DUBUQUE COUNTY 422705090561201 08801W11CABB 1978EPWORTH 3 (LAT 42 27 05N LONG 090 56 12W)										
JUL 1989 18...	23	2.8	--	38	69	0.10	17	518	7.00	<0.100
422910091072701 08902W30DCCC 1959DYERSVILLE 1 (LAT 42 29 10N LONG 091 07 27W)										
JUN 1989 01...	31	7.3	--	92	89	0.10	13	606	9.20	<0.100
JUL 18...	--	--	--	--	--	--	-	--	9.80	<0.100
423305091064901 08902W05CBBB 1898NEW VIENNA 1 (LAT 42 33 05N LONG 091 06 49W)										
JUN 1989 01...	9.6	0.70	--	24	24	0.20	24	344	5.60	<0.100
JUL 19...	--	--	--	--	--	--	--	--	5.00	<0.100
SEP 14...	--	--	--	--	--	--	--	--	5.40	<0.100
FAYETTE COUNTY 430010091390102 09507W34ACAD 1924CLERMONT 2 (LAT 43 00 10N LONG 091 39 10W)										
JUL 1989 19...	13	8.9	--	30	29	0.15	13	424	6.20	<0.100
FLOYD COUNTY 425754092515201 09417W16BBAA 1926MARBLE ROCK 1 (LAT 42 57 54N LONG 092 51 52W)										
JUL 1989 25...	5.0	1.4	--	5.0	--	0.25	13	254	<0.100	<0.100
FRANKLIN COUNTY 425341093132501 09320W05DDD 1956SHEFFIELD 2 (LAT 42 53 41N LONG 093 13 25W)										
MAY 1989 23...	7.1	1.0	--	11	26	0.15	21	326	10.0	<0.100
AUG 01...	--	--	--	--	--	--	--	--	9.50	<0.100

DATE	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P) (00671)	IRON, DISSOLVED (UG/L AS FE) (01046)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ATRAZINE, TOTAL (UG/L) (39630)	CYANAZINE TOTAL (UG/L) (81757)	METRIBUZIN IN WHOLE WATER (UG/L) (81408)	ALACHLOR TOTAL RECOVER (UG/L) (77825)	METOLACHLOR IN WHOLE WATER (UG/L) (39356)	BUTYLATE (UG/L) (99901)	TRIFLURALIN TOTAL RECOVER (UG/L) (39030)
				[Pesticide concentrations expressed as total recoverable]						
CRAWFORD COUNTY										
421004095272701 08540W13CCCC 1825SCHLESWIG 3 (LAT 42 10 04N LONG 095 27 27W)										
AUG 1989 17...	<0.100	<20	130	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
DALLAS COUNTY										
414130094021501 08027W31CDAA 1976DALLAS CENTER 4 (LAT 41 41 30N LONG 094 02 15W)										
MAY 1989 22...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 04...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415055094131202 08129W10BBBA 1969DAWSON 2 (LAT 41 50 55N LONG 094 13 12W)										
MAY 1989 23...	0.200	--	--	0.69	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 04...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
DELAWARE COUNTY										
422834091281601 08905W31DAAB 1970MANCHESTER 6 (LAT 42 28 34N LONG 091 28 16W)										
JUN 1989 01...	<0.100	<20	<20	0.47	<0.10	<0.10	0.20	<0.10	<0.10	<0.10
JUL 20...	<0.100	--	--	0.54	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 14...	<0.100	--	--	0.72	<0.10	<0.10	0.22	0.24	<0.10	<0.10
DES MOINES COUNTY										
410015091093401 07203W25CBCC 24057 1976MEDIAPOLIS 4 (LAT 41 00 15N LONG 091 09 34W)										
JUL 1989 25...	<0.100	190	300	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
DUBUQUE COUNTY										
422705090561201 08801W11CABB 1978EPWORTH 3 (LAT 42 27 05N LONG 090 56 12W)										
JUL 1989 18...	<0.100	<20	<20	0.21	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422910091072701 08902W30DCCC 1959DYERSVILLE 1 (LAT 42 29 10N LONG 091 07 27W)										
JUN 1989 01...	<0.100	30	20	0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 18...	<0.100	--	--	0.52	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423305091064901 08902W05CBBB 1898NEW VIENNA 1 (LAT 42 33 05N LONG 091 06 49W)										
JUN 1989 01...	0.100	<20	<20	0.31	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 19...	<0.100	--	--	0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 14...	<0.100	--	--	0.51	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
FAYETTE COUNTY										
430010091390102 09507W34ACAD 1924CLERMONT 2 (LAT 43 00 10N LONG 091 39 10W)										
JUL 1989 19...	<0.100	<20	<20	1.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
FLOYD COUNTY										
425754092515201 09417W16BBAA 1926MARBLE ROCK 1 (LAT 42 57 54N LONG 092 51 52W)										
JUL 1989 25...	<0.100	140	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
FRANKLIN COUNTY										
425341093132501 09320W05DDD 1956SHEFFIELD 2 (LAT 42 53 41N LONG 093 13 25W)										
MAY 1989 23...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 01...	0.100	--	--	--	--	--	--	--	--	--

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
FREMONT COUNTY										
405225095335001 06841W14CDBB 1966RANDOLPH 3 (LAT 40 52 25N LONG 095 33 50W)										
AUG 1989										
25...	0830	111ALVM	100	30	13.5	1150	7.20	380	93	35
GREENE COUNTY										
420104094324301 08332W11BDBD 1977SCRANTON 4 (LAT 42 01 04N LONG 094 32 43W)										
JUL 1989										
25...	1200	112PLSC	225	20	13.0	700	7.40	280	75	23
GRUNDY COUNTY										
421336092524401 08617W30CDDB 19097 1966CONRAD 4 (LAT 42 13 35N LONG 092 52 35W)										
MAY 1989										
23...	1100	339HMPN	210	60	11.0	605	7.39	320	84	27
AUG										
07...	1415	339HMPN	180	10	12.0	640	7.23	--	--	--
GUTHERIE COUNTY										
414035094302502 07931W06CDBC 1941GUTHRIE CENTER 2 (LAT 41 40 35N LONG 094 30 25W)										
MAY 198										
23...	1000	110QRCU	300	15	12.0	412	7.00	--	--	--
AUG										
03...	1600	110QRCU	300	20	14.0	420	6.70	--	--	--
415118094331301 08132W03DBDD 12608 1960BAYARD 2 (LAT 41 51 08N LONG 094 33 24W)										
AUG 1989										
04...	0900	325DSMS	100	20	13.0	600	7.40	260	58	28
HANCOCK COUNTY										
425936093572401 09426W06ABAA 04864 1950CORWITH 1 (LAT 42 59 36N LONG 093 57 24W)										
JUL 1989										
24...	1305	339HMPN	200	20	13.0	1050	7.50	360	92	32
430627093361301 09623W30ABD 00134 1932GARNER 1 (LAT 43 06 27N LONG 093 36 13W)										
AUG 1989										
02...	1310	344CDVL	175	20	10.0	680	7.40	370	84	38
HARDIN COUNTY										
422453093035001 08819W21DDC 05188 1951STEAMBOAT ROCK 1 (LAT 42 24 53N LONG 093 03 50W)										
AUG 1989										
01...	1510	339HMPN	--	20	11.0	690	7.30	400	100	37
HARRISON COUNTY										
413323095533101 07844W15CABC 1964MISSOURI VALLEY 1 (LAT 41 33 23N LONG 095 53 31W)										
AUG 1989										
07...	1130	111ALVM	650	30	14.5	1080	7.10	510	130	46
413715096003102 07944W30DCAB 1961MODALE 2 (LAT 41 37 15N LONG 096 00 31W)										
AUG 1989										
07...	1530	111ALVM	75	30	12.5	860	7.35	410	110	32
413819095471101 07942W19CBAB 1979LOGAN 7 (LAT 41 38 19N LONG 095 47 11W)										
AUG 1989										
07...	1345	111BRRV	110	30	12.5	1070	7.00	470	130	36
HOWARD COUNTY										
431443092261401 09714W01DDAB 1914ELMA 1 (LAT 43 14 43N LONG 092 26 14W)										
MAY 1989										
24...	1330	112PLSC	180	20	11.0	670	7.56	320	89	24
JUL										
24...	1315	112PLSC	--	60	11.0	--	6.68	--	--	--

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
FREMONT COUNTY										
405225095335001 06841W14CDBB 1966RANDOLPH 3 (LAT 40 52 25N LONG 095 33 50W)										
AUG 1989										
25...	13	5.0	278	22	99	0.40	19	--	3.00	0.100
GREENE COUNTY										
420104094324301 08332W11BDBD 1977SCRANTON 4 (LAT 42 01 04N LONG 094 32 43W)										
JUL 1989										
25...	20	3.2	366	1.0	13	0.40	17	356	<0.100	2.00
GRUNDY COUNTY										
421336092524401 08617W30CDDB 19097 1966CONRAD 4 (LAT 42 13 35N LONG 092 52 35W)										
MAY 1989										
23...	8.3	1.3	--	12	31	0.25	16	386	5.80	<0.100
AUG										
07...	--	--	279	--	--	--	--	--	5.40	<0.100
GUTHERIE COUNTY										
414035094302502 07931W06CDBC 1941GUTHRIE CENTER 2 (LAT 41 40 35N LONG 094 30 25W)										
MAY 1989										
23...	--	--	--	--	--	--	--	--	9.50	<0.100
AUG										
03...	--	--	--	--	--	--	--	--	7.90	<0.100
415118094331301 08132W03DBDD 12608 1960BAYARD 2 (LAT 41 51 08N LONG 094 33 24W)										
AUG 1989										
04...	17	6.6	359	8.0	8.1	0.60	9.6	378	<0.100	3.10
HANCOCK COUNTY										
425936093572401 09426W06ABAA 04864 1950CORWITH 1 (LAT 42 59 36N LONG 093 57 24W)										
JUL 1989										
24...	98	4.4	414	2.0	120	0.40	23	588	<0.100	0.500
430627093361301 09623W30ABD 00134 1932GARNER 1 (LAT 43 06 27N LONG 093 36 13W)										
AUG 1989										
02...	8.1	3.3	370	2.5	4.4	0.80	16	396	<0.100	0.200
HARDIN COUNTY										
422453093035001 08819W21DDC 05188 1951STEAMBOAT ROCK 1 (LAT 42 24 53N LONG 093 03 50W)										
AUG 1989										
01...	12	2.2	324	13	30	0.20	21	376	2.50	<0.100
HARRISON COUNTY										
413323095533101 07844W15CABC 1964MISSOURI VALLEY 1 (LAT 41 33 23N LONG 095 53 31W)										
AUG 1989										
07...	36	5.6	420	38	120	0.30	25	--	1.00	<0.100
413715096003102 07944W30DCAB 1961MODALE 2 (LAT 41 37 15N LONG 096 00 31W)										
AUG 1989										
07...	25	5.9	431	16	50	0.30	33	--	<0.100	1.00
413819095471101 07942W19CBAB 1979LOGAN 7 (LAT 41 38 19N LONG 095 47 11W)										
AUG 1989										
07...	47	6.0	386	54	110	0.25	29	--	2.30	0.300
HOWARD COUNTY										
431443092261401 09714W01DDAB 1914ELMA 1 (LAT 43 14 43N LONG 092 26 14W)										
MAY 1989										
24...	12	1.4	--	33	51	0.15	13	374	7.30	<0.100
JUL										
24...	--	--	234	--	--	--	--	--	7.20	<0.100

DATE	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P) (00671)	IRON, DISSOLVED (UG/L AS FE) (01046)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ATRAZINE, TOTAL (UG/L) (39630)	CYANAZINE TOTAL (UG/L) (81757)	METRIBUZIN IN WHOLE WATER (UG/L) (81408)	ALACHLOR TOTAL RECOVER (UG/L) (77825)	METOLACHLOR IN WHOLE WATER (UG/L) (39356)	BUTYLATE (UG/L) (99901)	TRIFLURALIN TOTAL RECOVER (UG/L) (39030)
				[Pesticide concentrations expressed as total recoverable]						
FREMONT COUNTY										
405225095335001 06841W14CDBB 1966RANDOLPH 3 (LAT 40 52 25N LONG 095 33 50W)										
AUG 1989										
25...	<0.100	20	120	0.46	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
GREENE COUNTY										
420104094324301 08332W11BDBD 1977SCRANTON 4 (LAT 42 01 04N LONG 094 32 43W)										
JUL 1989										
25...	<0.100	3100	140	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
GRUNDY COUNTY										
421336092524401 08617W30CDDB 19097 1966CONRAD 4 (LAT 42 13 35N LONG 092 52 35W)										
MAY 1989										
23...	<0.100	<20	<20	0.28	0.13	<0.10	<0.10	<0.10	<0.10	<0.10
AUG										
07...	<0.100	--	--	0.40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
GUTHERIE COUNTY										
414035094302502 07931W06CDBC 1941GUTHRIE CENTER 2 (LAT 41 40 35N LONG 094 30 25W)										
MAY 1989										
23...	0.100	--	--	0.25	0.22	<0.10	<0.10	<0.10	<0.10	<0.10
AUG										
03...	<0.100	--	--	3.7	4.5	2.10	<0.10	2.80	<0.10	<0.10
415118094331301 08132W03DBDD 12608 1960BAYARD 2 (LAT 41 51 08N LONG 094 33 24W)										
AUG 1989										
04...	<0.100	250	60	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
HANCOCK COUNTY										
425936093572401 09426W06ABAA 04864 1950CORWITH 1 (LAT 42 59 36N LONG 093 57 24W)										
JUL 1989										
24...	<0.100	790	120	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
430627093361301 09623W30ABD 00134 1932GARNER 1 (LAT 43 06 27N LONG 093 36 13W)										
AUG 1989										
02...	<0.100	100	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
HARDIN COUNTY										
422453093035001 08819W21DDC 05188 1951STEAMBOAT ROCK 1 (LAT 42 24 53N LONG 093 03 50W)										
AUG 1989										
01...	<0.100	460	210	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
HARRISON COUNTY										
413323095533101 07844W15CABC 1964MISSOURI VALLEY 1 (LAT 41 33 23N LONG 095 53 31W)										
AUG 1989										
07...	0.100	680	390	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413715096003102 07944W30DCAB 1961MODALE 2 (LAT 41 37 15N LONG 096 00 31W)										
AUG 1989										
07...	<0.100	6100	560	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
413819095471101 07942W19CBAB 1979LOGAN 7 (LAT 41 38 19N LONG 095 47 11W)										
AUG 1989										
07...	<0.100	4600	2000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
HOWARD COUNTY										
431443092261401 09714W01DDAB 1914ELMA 1 (LAT 43 14 43N LONG 092 26 14W)										
MAY 1989										
24...	<0.100	<20	<20	0.67	<0.10	<0.10	0.40	0.19	<0.10	<0.10
JUL										
24...	<0.100	--	--	0.89	0.12	<0.10	0.48	0.34	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
HOWARD COUNTY 432923092212501 10013W10DDAB 1898CHESTER 1 (LAT 43 29 23N LONG 092 21 25W)										
JUL 1989 24...	1430	344CDVL	150	5	11.0	--	6.54	270	74	20
HUMBOLDT COUNTY 424308094132601 09129W01CCAC 1973HUMBOLDT 1 (LAT 42 43 08N LONG 094 13 26W)										
JUL 1989 24...	1040	330MSSP	1000	20	12.0	650	7.30	360	95	29
424350094260001 09130W06BA 1957GILMORE CITY 3 (LAT 42 43 50N LONG 094 26 00W)										
JUL 1989 20...	1240	339HMPN	225	30	13.0	740	7.40	340	90	29
424548094171901 09229W20DDB 03374 1948RUTLAND 1 (LAT 42 45 48N LONG 094 17 19W)										
JUL 1989 20...	1120	339GLMC	97	--	13.0	700	7.30	330	89	27
424939093584201 09327W36ACD 04815 1951RENWICK 2 (LAT 42 49 39N LONG 093 58 42W)										
JUL 1989 24...	1425	339HMPN	167	20	13.0	860	7.10	380	98	34
425205094110801 09328W17CBDB 1968LIVERMORE 2 (LAT 42 52 05N LONG 094 11 08W)										
JUL 1989 20...	1000	330MSSP	130	30	13.0	740	7.20	350	94	29
IDA COUNTY 422018095205101 08739W23ABDD 1923ARTHUR 1 (LAT 42 20 18N LONG 095 20 51W)										
MAY 1989 24...	1215	112PLSC	110	30	8.5	680	7.50	330	91	26
JUL 18...	1245	112PLSC	110	30	10.0	720	7.25	--	--	--
SEP 18...	1245	112PLSC	110	30	12.0	710	7.11	--	--	--
422106095280201 08740W14ACBB 1965IDA GROVE 3 (LAT 42 21 06N LONG 095 28 02W)										
MAY 1989 24...	1330	112PLSC	450	30	12.5	970	7.20	440	130	27
JUL 18...	1345	112PLSC	450	30	13.0	980	7.30	--	--	--
SEP 18...	1145	112PLSC	450	30	12.0	980	7.18	--	--	--
IOWA COUNTY 414647091580701 08110W35DAAC 1979SOUTH AMANA 120 (LAT 41 46 47N LONG 091 58 07W)										
JUL 1989 25...	1530	112PLSC	--	15	12.5	705	6.89	350	94	27
414737092044101 08111W25CACD 1980MARENGO 9 (LAT 41 47 37N LONG 092 04 41W)										
JUL 1989 25...	1310	111ALVM	220	10	12.5	530	7.51	240	73	15
414811091564001 08109W30BBAB 1969HIGH AMANA 10 (LAT 41 48 11N LONG 091 56 40W)										
JUL 1989 25...	1440	111ALVM	--	30	12.0	705	7.31	350	87	33
414821091575101 08110W24CCAC 1954WEST AMANA 11 (LAT 41 48 21N LONG 091 57 51W)										
JUL 1989 25...	1510	112PLSC	--	10	12.5	690	6.85	400	97	38

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
HOWARD COUNTY										
432923092212501 10013W10DDAB 1898CHESTER 1 (LAT 43 29 23N LONG 092 21 25W)										
JUL 1989 24...	12	2.2	--	0.50	--	0.85	14	308	<0.100	1.00
HUMBOLDT COUNTY										
424308094132601 09129W01CCAC 1973HUMBOLDT 1 (LAT 42 43 08N LONG 094 13 26W)										
JUL 1989 24...	6.3	3.0	274	16	40	0.35	22	474	4.50	<0.100
424350094260001 09130W06BA 1957GILMORE CITY 3 (LAT 42 43 50N LONG 094 26 00W)										
JUL 1989 20...	9.6	2.0	272	21	56	0.30	27	460	5.80	<0.100
424548094171901 09229W20DDB 03374 1948RUTLAND 1 (LAT 42 45 48N LONG 094 17 19W)										
JUL 1989 20...	11	2.6	321	4.5	44	0.30	23	420	0.500	<0.100
424939093584201 09327W36ACD 04815 1951RENWICK 2 (LAT 42 49 39N LONG 093 58 42W)										
JUL 1989 24...	39	3.0	276	1.0	92	0.30	19	418	<0.100	1.00
425205094110801 09328W17CBDB 1968LIVERMORE 2 (LAT 42 52 05N LONG 094 11 08W)										
JUL 1989 20...	28	3.4	377	2.0	48	0.35	19	464	0.200	0.600
IDA COUNTY										
422018095205101 08739W23ABDD 1923ARTHUR 1 (LAT 42 20 18N LONG 095 20 51W)										
MAY 1989 24...	11	0.60	284	12	43	0.40	16	352	7.70	<0.100
JUL 18...	--	--	--	--	--	--	--	--	6.60	<0.100
SEP 18...	--	--	--	--	--	--	--	--	6.70	<0.100
422106095280201 08740W14ACBB 1965IDA GROVE 3 (LAT 42 21 06N LONG 095 28 02W)										
MAY 1989 24...	27	2.5	310	70	87	0.25	23	584	3.40	<0.100
JUL 18...	--	--	--	--	--	--	--	--	3.20	<0.100
SEP 18...	--	--	--	--	--	--	--	--	3.10	<0.100
IOWA COUNTY										
414647091580701 08110W35DAAC 1979SOUTH AMANA 120 (LAT 41 46 47N LONG 091 58 07W)										
JUL 1989 25...	39	3.9	--	43	60	0.15	16	404	6.10	<0.100
414737092044101 08111W25CACD 1980MARENGO 9 (LAT 41 47 37N LONG 092 04 41W)										
JUL 1989 25...	27	1.6	--	23	61	0.20	19	294	6.30	<0.100
414811091564001 08109W30BBAB 1969HIGH AMANA 10 (LAT 41 48 11N LONG 091 56 40W)										
JUL 1989 25...	14	1.1	--	11	22	0.25	20	378	5.20	<0.100
414821091575101 08110W24CCAC 1954WEST AMANA 11 (LAT 41 48 21N LONG 091 57 51W)										
JUL 1989 25...	36	1.0	--	42	59	0.25	20	428	4.50	<0.100

DATE	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ATRA- ZINE, TOTAL (UG/L) (39630)	CYAN- AZINE TOTAL (UG/L) (81757)	METRI- BUZIN IN WHOLE WATER (UG/L) (81408)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA- CHLOR IN WHOLE WATER (UG/L) (39356)	(99901)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)
HOWARD COUNTY										
432923092212501 10013W10DDAB 1898CHESTER 1 (LAT 43 29 23N LONG 092 21 25W)										
JUL 1989 24...	<0.100	1400	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
HUMBOLDT COUNTY										
424308094132601 09129W01CCAC 1973HUMBOLDT 1 (LAT 42 43 08N LONG 094 13 26W)										
JUL 1989 24...	<0.100	<20	<20	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424350094260001 09130W06BA 1957GILMORE CITY 3 (LAT 42 43 50N LONG 094 26 00W)										
JUL 1989 20...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424548094171901 09229W20DDB 03374 1948RUTLAND 1 (LAT 42 45 48N LONG 094 17 19W)										
JUL 1989 20...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424939093584201 09327W36ACD 04815 1951RENWICK 2 (LAT 42 49 39N LONG 093 58 42W)										
JUL 1989 24...	<0.100	1400	360	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425205094110801 09328W17CBDB 1968LIVERMORE 2 (LAT 42 52 05N LONG 094 11 08W)										
JUL 1989 20...	<0.100	300	50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
IDA COUNTY										
422018095205101 08739W23ABDD 1923ARTHUR 1 (LAT 42 20 18N LONG 095 20 51W)										
MAY 1989 24...	0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 18...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 18...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422106095280201 08740W14ACBB 1965IDA GROVE 3 (LAT 42 21 06N LONG 095 28 02W)										
MAY 1989 24...	0.200	<20	160	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 18...	0.100	--	--	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 18...	0.100	--	--	0.16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
IOWA COUNTY										
414647091580701 08110W35DAAC 1979SOUTH AMANA 120 (LAT 41 46 47N LONG 091 58 07W)										
JUL 1989 25...	<0.100	50	50	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414737092044101 08111W25CACD 1980MARENGO 9 (LAT 41 47 37N LONG 092 04 41W)										
JUL 1989 25...	0.100	120	180	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414811091564001 08109W30BBAB 1969HIGH AMANA 10 (LAT 41 48 11N LONG 091 56 40W)										
JUL 1989 25...	0.200	70	<20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
414821091575101 08110W24CCAC 1954WEST AMANA 11 (LAT 41 48 21N LONG 091 57 51W)										
JUL 1989 25...	0.100	60	<20	<0.10	<0.10	<0.10	0.57	<0.10	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
JACKSON COUNTY										
420414090113202 08407E19BD 1920SABULA 2 (LAT 42 04 14N LONG 090 11 32W)										
JUN 1989 02...	1100	350SLRN	160	20	13.0	585	7.21	310	77	29
JUL 18...	1300	350SLRN	160	20	14.0	630	7.06	--	--	--
SEP 14...	1530	350SLRN	160	15	13.0	630	7.28	--	--	--
420432090401201 08402E24AAB 06212 1953MAQUOKETA 3 (LAT 42 04 32N LONG 090 40 12W)										
MAY 1989 31...	1515	112PLSC	550	60	12.0	810	7.33	400	96	38
JUL 17...	1400	112PLSC	550	60	14.0	705	7.25	--	--	--
SEP 22...	1300	112PLSC	550	20	12.0	780	7.20	--	--	--
420912090352101 08503E22DAA 06141 1953ANDREW 1 (LAT 42 09 12N LONG 090 35 21W)										
JUL 1989 17...	1530	358EDGD	30	60	11.0	640	6.97	360	76	42
JASPER COUNTY										
414251092541701 08018W26AADC 1939KELLOGG 1 (LAT 41 42 51N LONG 092 54 17W)										
JUN 1989 01...	1220	111ALVM	25	10	12.0	820	6.66	390	110	27
JUL 25...	1315	111ALVM	30	15	13.0	812	6.80	--	--	--
414913092464001 08117W13CC 16580 1964NEWBURG 1 (LAT 41 49 13N LONG 092 46 40W)										
JUL 1989 25...	1130	333STLS	50	20	12.0	1310	7.40	570	120	66
JONES COUNTY										
420102091214101 08304W07B 21792 1969MARTELLE 2 (LAT 42 01 02N LONG 091 21 41W)										
AUG 1989 01...	1600	355NIGR	150	20	11.0	350	7.50	190	50	16
KEOKUK COUNTY										
411849092115401 07512W12CBCA 1958SIGOURNEY 5 (LAT 41 18 49N LONG 092 11 54W)										
JUN 1989 02...	0930	111ALVM	--	20	11.0	690	7.07	310	90	21
JUL 26...	1445	111ALVM	75	180	12.5	625	7.20	--	--	--
412138091571501 07610W25ACCA 01794 1943KEOTA 2 (LAT 41 21 38N LONG 091 57 15W)										
JUL 1989 26...	1600	339WSVL	80	15	14.0	880	7.10	440	110	41
412715092051501 07711W23DDCC 1969SOUTH ENGLISH 3 (LAT 41 27 15N LONG 092 05 15W)										
JUL 1989 27...	1030	330MSSP	10	180	14.0	2000	7.00	1100	260	120
KOSSUTH COUNTY										
430340094252703 09530W08BBCD 1978WHITTEMORE 3 (LAT 43 03 40N LONG 094 25 27W)										
JUL 1989 18...	1420	112PLSC	140	--	12.0	1200	7.00	460	120	38
431255094253101 09730W18DACD 00533 1937FENTON 2 (LAT 43 12 55N LONG 094 25 31W)										
JUL 1989 18...	1325	217DKOT	261	30	11.0	1610	7.10	660	170	57

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
JACKSON COUNTY 420414090113202 08407E19BD 1920SABULA 2 (LAT 42 04 14N LONG 090 11 32W)										
JUN 1989 02...	9.8	1.8	--	9.5	29	0.25	25	320	4.40	<0.100
JUL 18...	--	--	--	--	--	--	--	--	4.20	<0.100
SEP 14...	--	--	--	--	--	--	--	--	4.30	<0.100
420432090401201 08402E24AAB 06212 1953MAQUOKETA 3 (LAT 42 04 32N LONG 090 40 12W)										
MAY 1989 31...	18	1.5	--	36	48	0.30	22	416	5.50	<0.100
JUL 17...	--	--	--	--	--	--	--	--	5.30	<0.100
SEP 22...	--	--	--	--	--	--	--	--	4.90	<0.100
420912090352101 08503E22DAA 06141 1953ANDREW 1 (LAT 42 09 12N LONG 090 35 21W)										
JUL 1989 17...	14	0.60	330	15	23	0.20	18	444	8.00	<0.100
JASPER COUNTY 414251092541701 08018W26AADC 1939KELLOGG 1 (LAT 41 42 51N LONG 092 54 17W)										
JUN 1989 01...	29	2.3	--	37	170	0.15	23	506	2.80	<0.100
JUL 25...	--	--	--	--	--	--	--	--	6.40	<0.100
414913092464001 08117W13CC 16580 1964NEWBURG 1 (LAT 41 49 13N LONG 092 46 40W)										
JUL 1989 25...	92	8.3	463	2.0	260	0.30	18	794	0.100	6.00
JONES COUNTY 420102091214101 08304W07B 21792 1969MARTELLE 2 (LAT 42 01 02N LONG 091 21 41W)										
AUG 1989 01...	4.4	0.40	188	0.50	4.6	0.30	15	112	<0.100	<0.100
KEOKUK COUNTY 411849092115401 07512W12CBCA 1958SIGOURNEY 5 (LAT 41 18 49N LONG 092 11 54W)										
JUN 1989 02...	12	1.0	--	18	78	0.20	18	352	<0.100	<0.100
JUL 26...	--	--	--	--	--	--	--	--	<0.100	0.100
412138091571501 07610W25ACCA 01794 1943KEOTA 2 (LAT 41 21 38N LONG 091 57 15W)										
JUL 1989 26...	31	3.0	420	10	56	0.40	10	514	<0.100	0.200
412715092051501 07711W23DDCC 1969SOUTH ENGLISH 3 (LAT 41 27 15N LONG 092 05 15W)										
JUL 1989 27...	76	7.6	423	2.0	710	0.40	8.3	1690	<0.100	3.90
KOSSUTH COUNTY 430340094252703 09530W08BBCD 1978WHITTEMORE 3 (LAT 43 03 40N LONG 094 25 27W)										
JUL 1989 18...	67	5.6	391	2.5	220	0.50	22	762	<0.100	0.900
431255094253101 09730W18DACD 00533 1937FENTON 2 (LAT 43 12 55N LONG 094 25 31W)										
JUL 1989 18...	120	4.7	389	2.0	560	0.40	23	1190	<0.100	0.800

[Pesticide concentrations expressed as total recoverable]

DATE	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ATRA-ZINE, TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	METRI-BUZIN IN WHOLE WATER (UG/L) (81408)	ALA-CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA-CHLOR IN WHOLE WATER (UG/L) (39356)	BUTY-LATE (UG/L) (99901)	TRI-FLURA-LIN TOTAL RECOVER (UG/L) (39030)
JACKSON COUNTY										
420414090113202 08407E19BD 1920SABULA 2 (LAT 42 04 14N LONG 090 11 32W)										
JUN 1989 02...	<0.100	<20	650	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 18...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 14...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420432090401201 08402E24AAB 06212 1953MAQUOKETA 3 (LAT 42 04 32N LONG 090 40 12W)										
MAY 1989 31...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 17...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 22...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420912090352101 08503E22DAA 06141 1953ANDREW 1 (LAT 42 09 12N LONG 090 35 21W)										
JUL 1989 17...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JASPER COUNTY										
414251092541701 08018W26AADC 1939KELLOGG 1 (LAT 41 42 51N LONG 092 54 17W)										
JUN 1989 01...	<0.100	280	110	0.22	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 25...	<0.100	--	--	0.35	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414913092464001 08117W13CC 16580 1964NEWBURG 1 (LAT 41 49 13N LONG 092 46 40W)										
JUL 1989 25...	<0.100	3000	230	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JONES COUNTY										
420102091214101 08304W07B 21792 1969MARTELLE 2 (LAT 42 01 02N LONG 091 21 41W)										
AUG 1989 01...	<0.100	760	20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
KEOKUK COUNTY										
411849092115401 07512W12CBCA 1958SIGOURNEY 5 (LAT 41 18 49N LONG 092 11 54W)										
JUN 1989 02...	<0.100	2100	700	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 26...	0.200	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412138091571501 07610W25ACCA 01794 1943KEOTA 2 (LAT 41 21 38N LONG 091 57 15W)										
JUL 1989 26...	<0.100	1100	30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412715092051501 07711W23DDCC 1969SOUTH ENGLISH 3 (LAT 41 27 15N LONG 092 05 15W)										
JUL 1989 27...	<0.100	1900	540	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
KOSSUTH COUNTY										
430340094252703 09530W08BBCD 1978WHITTEMORE 3 (LAT 43 03 40N LONG 094 25 27W)										
JUL 1989 18...	<0.100	1800	180	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431255094253101 09730W18DACD 00533 1937FENTON 2 (LAT 43 12 55N LONG 094 25 31W)										
JUL 1989 18...	<0.100	1800	220	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
KOSSUTH COUNTY										
432247094052802 09928W24ADCA 22018 1969LAKOTA 2 (LAT 43 22 47N LONG 094 05 28W)										
JUL 1989 18...	1120	344CDVL	130	30	12.0	850	7.10	370	95	32
LINN COUNTY										
420025091414601 08307W17BBBB 1964CEDAR RAPIDS W3 (LAT 42 00 25N LONG 091 41 46W)										
MAY 1989 31...	1030	111ALVM	--	60	10.0	514	7.60	230	60	20
AUG 04...	0900	111ALVM	2500	20	12.0	600	7.28	--	--	--
421138091471801 08508W09BAB 18947 1966CENTER POINT 1 (LAT 42 11 38N LONG 091 47 18W)										
JUN 1989 23...	1000	344SOLN	125	20	13.0	630	6.98	300	99	13
AUG 04...	1000	344SOLN	110	20	12.0	700	6.76	--	--	--
421420091251501 08605W22CCCC 1910PRAIRIEBURG 1 (LAT 42 14 20N LONG 091 25 15W)										
AUG 1989 18...	0930	350SLRN	120	20	11.0	710	7.50	280	58	34
LOUISA COUNTY										
411644091110701 07503W22DCBD 18796 1966GRANDVIEW 1 (LAT 41 16 44N LONG 091 11 07W)										
JUL 1989 25...	0830	112AFNN	--	15	12.5	510	7.49	260	72	20
LYON COUNTY										
432608096201502 10047W36DC LESTER 3 (LAT 43 26 08N LONG 096 20 15W)										
AUG 1989 02...	1630	111ALVM	45	60	10.5	1160	7.45	620	170	48
432622096101901 10045W33CBAB 1925ROCK RAPIDS 2 (LAT 43 26 22N LONG 096 10 19W)										
MAY 1989 25...	1030	111ALVM	200	30	11.0	865	7.10	430	110	37
JUL 19...	1100	111ALVM	100	30	11.0	890	7.30	--	--	--
SEP 19...	0900	111ALVM	200	30	11.0	890	7.33	--	--	--
411047093493301 07426W27DADA 21161 1968TRURO 2 (LAT 41 10 47N LONG 093 49 33W)										
AUG 1989 21...	1330	112PLSC	48	20	12.0	495	7.10	210	66	11
MARION COUNTY										
412132092575201 07618W29BCAC 1971PELLA RANEY WELL (LAT 41 21 32N LONG 092 57 52W)										
JUL 1989 26...	1100	111ALVM	950	1440	22.0	580	7.50	260	66	23
MARSHALL COUNTY										
420020092465001 08317W13BA 07265 1955LE GRAND 2 (LAT 42 00 20N LONG 092 46 50W)										
JUN 1989 01...	0945	339PPCH	100	25	12.0	755	6.95	350	92	29
AUG 07...	1200	339PPCH	100	5	11.0	780	7.29	--	--	--
420613092593601 08418W07BACA 1969ALBION 2 (LAT 42 06 13N LONG 092 59 36W)										
JUN 1989 01...	1100	111ALVM	--	25	11.0	715	7.01	380	96	33
AUG 07...	1530	111ALVM	--	5	11.0	740	6.52	--	--	--

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
KOSSUTH COUNTY 432247094052802 09928W24ADCA 22018 1969LAKOTA 2 (LAT 43 22 47N LONG 094 05 28W)										
JUL 1989 18...	51	5.9	388	1.0	100	0.55	12	568	<0.100	1.30
LINN COUNTY 420025091414601 08307W17BBBB 1964CEDAR RAPIDS W3 (LAT 42 00 25N LONG 091 41 46W)										
MAY 1989 31...	18	3.0	--	31	48	0.20	15	264	<0.100	2.00
AUG 04...	--	--	--	--	--	--	--	--	<0.100	2.40
421138091471801 08508W09BAB 18947 1966CENTER POINT 1 (LAT 42 11 38N LONG 091 47 18W)										
JUN 1989 23...	25	1.9	--	42	62	--	14	408	3.10	0.100
AUG 04...	--	--	--	--	--	--	--	--	3.00	<0.100
421420091251501 08605W22CCCC 1910PRAIRIEBURG 1 (LAT 42 14 20N LONG 091 25 15W)										
AUG 1989 18...	39	3.9	297	1.5	78	0.45	9.2	416	<0.100	3.80
LOUISA COUNTY 411644091110701 07503W22DCBD 18796 1966GRANDVIEW 1 (LAT 41 16 44N LONG 091 11 07W)										
JUL 1989 25...	14	1.1	--	1.0	6.8	0.30	23	250	<0.100	1.00
LYON COUNTY 432608096201502 10047W36DC LESTER 3 (LAT 43 26 08N LONG 096 20 15W)										
AUG 1989 02...	28	3.4	304	22	310	0.50	17	--	<0.100	0.300
432622096101901 10045W33CBAB 1925ROCK RAPIDS 2 (LAT 43 26 22N LONG 096 10 19W)										
MAY 1989 25...	16	4.2	314	22	92	0.30	20	522	8.60	0.300
JUL 19...	--	--	--	--	--	--	--	--	7.20	0.300
SEP 19...	--	--	--	--	--	--	--	--	7.70	0.300
411047093493301 07426W27DADA 21161 1968TRURO 2 (LAT 41 10 47N LONG 093 49 33W)										
AUG 1989 21...	15	0.60	219	7.0	32	0.45	27	--	0.100	0.300
MARION COUNTY 412132092575201 07618W29BCAC 1971PELLA RANEY WELL (LAT 41 21 32N LONG 092 57 52W)										
JUL 1989 26...	18	5.1	202	28	49	0.45	12	312	1.10	0.100
MARSHALL COUNTY 420020092465001 08317W13BA 07265 1955LE GRAND 2 (LAT 42 00 20N LONG 092 46 50W)										
JUN 1989 01...	24	1.2	--	53	66	0.15	27	448	6.20	<0.100
AUG 07...	--	--	247	--	--	--	--	--	5.90	<0.100
420613092593601 08418W07BACA 1969ALBION 2 (LAT 42 06 13N LONG 092 59 36W)										
JUN 1989 01...	11	0.80	--	22	56	0.20	20	398	2.60	<0.100
AUG 07...	--	--	304	--	--	--	--	--	2.50	<0.100

[Pesticide concentrations expressed as total recoverable]

DATE	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P) (00671)	IRON, DISSOLVED (UG/L AS FE) (01046)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ATRAZINE, TOTAL (UG/L) (39630)	CYANAZINE TOTAL (UG/L) (81757)	METRIBUZIN IN WHOLE WATER (UG/L) (81408)	ALACHLOR TOTAL RECOVER (UG/L) (77825)	METOLACHLOR IN WHOLE WATER (UG/L) (39356)	BUTYLATE (UG/L) (99901)	TRIFLURALIN TOTAL RECOVER (UG/L) (39030)
KOSSUTH COUNTY										
432247094052802 09928W24ADCA 22018 1969LAKOTA 2 (LAT 43 22 47N LONG 094 05 28W)										
JUL 1989 18...	<0.100	1200	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
LINN COUNTY										
420025091414601 08307W17BBBB 1964CEDAR RAPIDS W3 (LAT 42 00 25N LONG 091 41 46W)										
MAY 1989 31...	0.200	2800	1000	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 04...	0.200	--	--	0.17	0.14	<0.10	<0.10	<0.10	<0.10	<0.10
421138091471801 08508W09BAB 18947 1966CENTER POINT 1 (LAT 42 11 38N LONG 091 47 18W)										
JUN 1989 23...	<0.100	460	80	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 04...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421420091251501 08605W22CCCC 1910PRAIRIEBURG 1 (LAT 42 14 20N LONG 091 25 15W)										
AUG 1989 18...	0.100	820	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
LOUISA COUNTY										
411644091110701 07503W22DCBD 18796 1966GRANDVIEW 1 (LAT 41 16 44N LONG 091 11 07W)										
JUL 1989 25...	<0.100	130	80	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
LYON COUNTY										
432608096201502 10047W36DC LESTER 3 (LAT 43 26 08N LONG 096 20 15W)										
AUG 1989 02...	<0.100	2200	1300	0.24	0.40	<0.10	<0.10	<0.10	<0.10	<0.10
432622096101901 10045W33CBAB 1925ROCK RAPIDS 2 (LAT 43 26 22N LONG 096 10 19W)										
MAY 1989 25...	0.100	<20	100	0.19	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 19...	<0.100	--	--	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 19...	<0.100	--	--	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
411047093493301 07426W27DADA 21161 1968TRURO 2 (LAT 41 10 47N LONG 093 49 33W)										
AUG 1989 21...	0.100	10000	930	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
MARION COUNTY										
412132092575201 07618W29BCAC 1971PELLA RANEY WELL (LAT 41 21 32N LONG 092 57 52W)										
JUL 1989 26...	<0.100	540	540	1.6	0.77	<0.10	<0.10	0.91	<0.10	<0.10
MARSHALL COUNTY										
420020092465001 08317W13BA 07265 1955LE GRAND 2 (LAT 42 00 20N LONG 092 46 50W)										
JUN 1989 01...	0.100	<20	<20	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 07...	<0.100	--	--	1.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420613092593601 08418W07BACA 1969ALBION 2 (LAT 42 06 13N LONG 092 59 36W)										
JUN 1989 01...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 07...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

DATE	TIME	GEOLOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)
MITCHELL COUNTY										
431337092462801 09716W07DD ORCHARD 2 (LAT 43 13 37N LONG 092 46 28W)										
JUL 1989 24...	1615	350SLRN	150	5	12.0	--	6.94	240	61	22
432241092550802 09918W24CABA 1960SAINT ANSGAR 2 (LAT 43 22 41N LONG 092 55 08W)										
JUL 1989 25...	0900	344CDVL	255	60	10.0	--	7.32	310	82	25
MONONA COUNTY										
415518095510001 08243W09DDCD 1932MOORHEAD 1 (LAT 41 55 18N LONG 095 51 00W)										
AUG 1989 08...	0830	111SDRV	200	30	14.0	870	7.30	430	110	37
415558096044901 08245W09ADAD 1964BLENCOE 1 (LAT 41 55 58N LONG 096 04 49W)										
AUG 1989 07...	1645	111ALVM	60	30	12.5	1180	7.20	590	160	46
415901095465601 08342W19CACC 1974SOLDIER 4 (LAT 41 59 01N LONG 095 46 56W)										
AUG 1989 08...	0930	112PLSC	100	30	13.0	1700	7.60	640	180	46
420140096054001 08345W04CBDB 1964ONAWA 5 (LAT 42 01 40N LONG 096 05 40W)										
AUG 1989 08...	1430	111ALVM	650	30	13.0	930	7.30	440	120	33
420241095422001 08442W35CABB 1974UTE 3 (LAT 42 02 41N LONG 095 42 20W)										
MAY 1989 24...	1000	111SDRV	150	30	13.0	910	7.35	440	120	35
JUL 18...	0730	111SDRV	150	30	13.0	950	7.10	--	--	--
SEP 20...	1310	111SDRV	150	30	13.0	940	7.16	--	--	--
420735096085701 08446W01BABC 1974WHITING 3 (LAT 42 07 35N LONG 096 08 57W)										
AUG 1989 11...	1245	111ALVM	150	30	12.0	1160	7.30	610	160	52
420955095475601 08543W24BDBA 1973MAPLETON 5 (LAT 42 10 03N LONG 095 47 49W)										
AUG 1989 08...	1115	111ALVM	400	30	12.0	790	7.40	400	110	30
O'BRIEN COUNTY										
430013095385902 09541W35DBA 1978PAULLINA 5 (LAT 43 00 13N LONG 095 38 59W)										
AUG 1989 09...	1015	111ALVM	380	30	10.5	820	7.30	400	110	30
431045095413401 09741W33ACCC 1980SANBORN 4 (LAT 43 10 45N LONG 095 41 34W)										
AUG 1989 09...	1200	112PLSC	250	30	10.0	870	7.20	460	130	33
431203095513001 09742W19CCDC 1979SHELDON 10 (LAT 43 12 03N LONG 095 51 30W)										
AUG 1989 10...	1000	111ALVM	100	30	14.0	770	7.40	390	95	37

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
MITCHELL COUNTY										
431337092462801 09716W07DD ORCHARD 2 (LAT 43 13 37N LONG 092 46 28W)										
JUL 1989 24...	15	2.9	--	4.5	--	0.85	9.6	454	<0.100	0.600
432241092550802 09918W24CABA 1960SAINT ANSGAR 2 (LAT 43 22 41N LONG 092 55 08W)										
JUL 1989 25...	9.6	1.1	--	16	61	0.15	12	384	3.40	<0.100
MONONA COUNTY										
415518095510001 08243W09DDCD 1932MOORHEAD 1 (LAT 41 55 18N LONG 095 51 00W)										
AUG 1989 08...	14	8.9	376	22	38	0.30	27	--	7.90	<0.100
415558096044901 08245W09ADAD 1964BLENCOE 1 (LAT 41 55 58N LONG 096 04 49W)										
AUG 1989 07...	37	7.8	558	5.0	150	0.30	35	--	<0.100	1.20
415901095465601 08342W19CACC 1974SOLDIER 4 (LAT 41 59 01N LONG 095 46 56W)										
AUG 1989 08...	160	10	254	7.5	680	0.30	31	--	<0.100	2.00
420140096054001 08345W04CBDB 1964ONAWA 5 (LAT 42 01 40N LONG 096 05 40W)										
AUG 1989 08...	24	7.7	419	17	78	0.50	32	--	<0.100	0.700
420241095422001 08442W35CABB 1974UTE 3 (LAT 42 02 41N LONG 095 42 20W)										
MAY 1989 24...	11	3.8	316	26	58	0.25	23	596	18.0	<0.100
JUL 18...	--	--	--	--	--	--	--	--	16.0	<0.100
SEP 20...	--	--	--	--	--	--	--	--	16.0	<0.100
420735096085701 08446W01BABC 1974WHITING 3 (LAT 42 07 35N LONG 096 08 57W)										
AUG 1989 11...	32	8.9	448	23	200	0.45	31	--	<0.100	0.800
420955095475601 08543W24BDBA 1973MAPLETON 5 (LAT 42 10 03N LONG 095 47 49W)										
AUG 1989 08...	17	4.0	317	13	67	0.35	27	--	7.10	<0.100
O'BRIEN COUNTY										
430013095385902 09541W35DBA 1978PAULLINA 5 (LAT 43 00 13N LONG 095 38 59W)										
AUG 1989 09...	9.1	2.8	304	7.0	98	0.50	26	--	0.800	<0.100
431045095413401 09741W33ACCC 1980SANBORN 4 (LAT 43 10 45N LONG 095 41 34W)										
AUG 1989 09...	14	3.8	355	12	100	0.60	28	--	1.80	<0.100
431203095513001 09742W19CCDC 1979SHELDON 10 (LAT 43 12 03N LONG 095 51 30W)										
AUG 1989 10...	15	1.4	285	16	97	0.65	17	--	0.600	0.100

DATE	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P) (00671)	IRON, DISSOLVED (UG/L AS FE) (01046)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	ATRAZINE, TOTAL (UG/L) (39630)	CYANAZINE TOTAL (UG/L) (81757)	METRIBUZIN IN WHOLE WATER (UG/L) (81408)	ALACHLOR TOTAL RECOVER (UG/L) (77825)	METOLACHLOR IN WHOLE WATER (UG/L) (39356)	BUTYLATE (UG/L) (99901)	TRIFLURALIN TOTAL RECOVER (UG/L) (39030)
				[Pesticide concentrations expressed as total recoverable]						
MITCHELL COUNTY										
431337092462801 09716W07DD ORCHARD 2 (LAT 43 13 37N LONG 092 46 28W)										
JUL 1989 24...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432241092550802 09918W24CABA 1960SAINT ANSGAR 2 (LAT 43 22 41N LONG 092 55 08W)										
JUL 1989 25...	<0.100	<20	<20	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
MONONA COUNTY										
415518095510001 08243W09DDCD 1932MOORHEAD 1 (LAT 41 55 18N LONG 095 51 00W)										
AUG 1989 08...	<0.100	<20	20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415558096044901 08245W09ADAD 1964BLENCOE 1 (LAT 41 55 58N LONG 096 04 49W)										
AUG 1989 07...	<0.100	8000	510	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
415901095465601 08342W19CACC 1974SOLDIER 4 (LAT 41 59 01N LONG 095 46 56W)										
AUG 1989 08...	<0.100	1100	180	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420140096054001 08345W04CBDB 1964ONAWA 5 (LAT 42 01 40N LONG 096 05 40W)										
AUG 1989 08...	0.100	5900	370	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420241095422001 08442W35CABB 1974UTE 3 (LAT 42 02 41N LONG 095 42 20W)										
MAY 1989 24...	0.200	<20	<20	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 18...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 20...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420735096085701 08446W01BABC 1974WHITING 3 (LAT 42 07 35N LONG 096 08 57W)										
AUG 1989 11...	<0.100	8400	610	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
420955095475601 08543W24BDBA 1973MAPLETON 5 (LAT 42 10 03N LONG 095 47 [illegible]W)										
AUG 1989 08...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
O'BRIEN COUNTY										
430013095385902 09541W35DBA 1978PAULLINA 5 (LAT 43 00 13N LONG 095 38 59W)										
AUG 1989 09...	<0.100	60	380	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431045095413401 09741W33ACCC 1980SANBORN 4 (LAT 43 10 45N LONG 095 41 34W)										
AUG 1989 09...	<0.100	120	260	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431203095513001 09742W19CCDC 1979SHELDON 10 (LAT 43 12 03N LONG 095 51 30W)										
AUG 1989 10...	<0.100	1800	880	0.37	0.18	<0.10	<0.10	0.63	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)
OSCEOLA COUNTY										
431703095272401 09839W28ABBB 1972MELVIN 2 (LAT 43 17 03N LONG 095 27 24W)										
AUG 1989 09...	1445	110QRNR	150	30	10.5	685	7.40	360	100	26
432646095260201 10039W27DCDB 12508 1960HARRIS 2 (LAT 43 26 46N LONG 095 26 02W)										
AUG 1989 10...	0815	112PLSC	35	30	11.0	2200	7.10	1300	350	110
PALO ALTO COUNTY										
425611094410501 09433W25ABA 02863 1947MALLARD 3 (LAT 42 56 11N LONG 094 41 05W)										
AUG 1989 01...	1615	210CRCS	125	30	13.0	1400	7.00	690	170	65
PLYMOUTH COUNTY										
424305096145301 09146W11BBDD 19911 1967MERRILL 3 (LAT 42 43 05N LONG 096 14 53W)										
MAY 1989 26...	0900	110QRNR	220	30	13.0	940	7.20	460	120	40
JUL 20...	1505	110QRNR	220	30	14.0	860	7.35	--	--	--
SEP 19...	1400	110QRNR	200	30	13.0	890	7.24	--	--	--
424528096362001 09249W27DAAA 1965WESTFIELD 1 (LAT 42 45 28N LONG 096 36 20W)										
MAY 1989 25...	1445	110QRNR	35	20	13.0	1080	7.35	520	140	41
JUL 19...	1515	110QRNR	25	25	12.5	1090	7.20	--	--	--
SEP 19...	1245	110QRNR	35	20	12.0	1080	7.22	--	--	--
424911096033001 09244W05AA 1953OYENS 1 (LAT 42 49 11N LONG 096 03 30W)										
AUG 1989 18...	1100	217DKOT	100	10	13.5	690	7.45	330	92	25
424921095581501 09243W06BABA 1956REMSEN 3 (LAT 42 49 21N LONG 095 58 15W)										
MAY 1989 25...	1630	110QRNR	75	30	9.5	970	7.50	470	130	35
JUL 20...	0930	110QRNR	75	30	11.0	925	7.35	--	--	--
SEP 19...	1600	110QRNR	75	25	12.0	950	7.24	--	--	--
424948096332901 09348W31BDDC 1959AKRON 4 (LAT 42 49 48N LONG 096 33 29W)										
MAY 1989 25...	1335	112PLSC	200	30	12.5	1220	7.20	580	160	45
JUL 19...	1430	112PLSC	225	30	12.5	1190	7.20	--	--	--
SEP 19...	1150	112PLSC	200	30	13.0	1180	7.16	--	--	--
POLK COUNTY										
413342093432801 07825W15CAAC 1954WEST DES MOINES 9 (LAT 41 33 42N LONG 093 43 28W)										
MAY 1989 22...	1300	111ALVM	--	--	13.0	750	7.60	--	--	--
JUL 25...	1615	111ALVM	180	180	13.5	768	7.40	--	--	--
414051093190902 07921W05CAAA 09808 1958MITCHELLVILLE 2 (LAT 41 40 51N LONG 093 19 09W)										
MAY 1989 23...	1600	111ALVM	250	10	12.0	662	7.30	330	86	29
JUL 25...	1445	111ALVM	250	15	12.0	690	7.30	--	--	--

DATE	SODIUM, DISSOLVED (MG/L AS NA) (00930)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)
OSCEOLA COUNTY										
431703095272401 09839W28ABBB 1972MELVIN 2 (LAT 43 17 03N LONG 095 27 24W)										
AUG 1989 09...	5.1	2.2	243	11	100	0.35	27	--	<0.100	<0.100
432646095260201 10039W27DCDB 12508 1960HARRIS 2 (LAT 43 26 46N LONG 095 26 02W)										
AUG 1989 10...	41	12	326	1.5	1200	0.40	30	--	<0.100	1.50
PALO ALTO COUNTY										
425611094410501 09433W25ABA 02863 1947MALLARD 3 (LAT 42 56 11N LONG 094 41 05W)										
AUG 1989 01...	76	4.3	452	5.5	340	0.35	30	1070	<0.100	2.20
PLYMOUTH COUNTY										
424305096145301 09146W11BBDD 19911 1967MERRILL 3 (LAT 42 43 05N LONG 096 14 53W)										
MAY 1989 26...	16	4.1	342	26	84	0.30	24	534	10.0	<0.100
JUL 20...	--	--	--	--	--	--	--	--	7.40	<0.100
SEP 19...	--	--	--	--	--	--	--	--	8.80	<0.100
424528096362001 09249W27DAAA 1965WESTFIELD 1 (LAT 42 45 28N LONG 096 36 20W)										
MAY 1989 25...	25	6.7	322	10	210	0.25	27	718	14.0	<0.100
JUL 19...	--	--	--	--	--	--	--	--	14.0	<0.100
SEP 19...	--	--	--	--	--	--	--	--	15.0	<0.100
424911096033001 09244W05AA 1953OYENS 1 (LAT 42 49 11N LONG 096 03 30W)										
AUG 1989 18...	13	4.5	292	2.5	61	0.30	46	--	<0.100	0.100
424921095581501 09243W06BABA 1956REMSEN 3 (LAT 42 49 21N LONG 095 58 15W)										
MAY 1989 25...	21	2.5	298	26	160	0.40	24	622	7.50	<0.100
JUL 20...	--	--	--	--	--	--	--	--	6.90	<0.100
SEP 19...	--	--	--	--	--	--	--	--	6.40	<0.100
424948096332901 09348W31BDDC 1959AKRON 4 (LAT 42 49 48N LONG 096 33 29W)										
MAY 1989 25...	23	7.6	368	24	240	0.15	28	806	9.70	<0.100
JUL 19...	--	--	--	--	--	--	--	--	9.80	<0.100
SEP 19...	--	--	--	--	--	--	--	--	9.10	<0.100
POLK COUNTY										
413342093432801 07825W15CAAC 1954WEST DES MOINES 9 (LAT 41 33 42N LONG 093 43 28W)										
MAY 1989 22...	--	--	--	--	--	--	--	--	0.800	<0.100
JUL 25...	--	--	--	--	--	--	--	--	0.700	<0.100
414051093190902 07921W05CAAA 09808 1958MITCHELLVILLE 2 (LAT 41 40 51N LONG 093 19 09W)										
MAY 1989 23...	10	0.90	--	16	27	0.20	24	382	3.20	<0.100
JUL 25...	--	--	--	--	--	--	--	--	3.10	<0.100

DATE	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ATRA-ZINE, TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	METRI-BUZIN IN WHOLE WATER (UG/L) (81408)	ALA-CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA-CHLOR IN WHOLE WATER (UG/L) (39356)	BUTY-LATE (UG/L) (99901)	TRI-FLURA-LIN TOTAL RECOVER (UG/L) (39030)
				[Pesticide concentrations expressed as total recoverable]						
OSCELOA COUNTY										
431703095272401 09839W28ABBB 1972MELVIN 2 (LAT 43 17 03N LONG 095 27 24W)										
AUG 1989										
09...	<0.100	1600	470	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
432646095260201 10039W27DCDB 12508 1960HARRIS 2 (LAT 43 26 46N LONG 095 26 02W)										
AUG 1989										
10...	<0.100	4900	760	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
PALO ALTO COUNTY										
425611094410501 09433W25ABA 02863 1947MALLARD 3 (LAT 42 56 11N LONG 094 41 05W)										
AUG 1989										
01...	<0.100	7600	40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
PLYMOUTH COUNTY										
424305096145301 09146W11BBDD 19911 1967MERRILL 3 (LAT 42 43 05N LONG 096 14 53W)										
MAY 1989										
26...	0.100	<20	<20	1.7	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
JUL										
20...	<0.100	--	--	0.98	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP										
19...	<0.100	--	--	1.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424528096362001 09249W27DAAA 1965WESTFIELD 1 (LAT 42 45 28N LONG 096 36 20W)										
MAY 1989										
25...	0.100	120	100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL										
19...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP										
19...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424911096033001 09244W05AA 1953OYENS 1 (LAT 42 49 11N LONG 096 03 30W)										
AUG 1989										
18...	0.100	530	340	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
424921095581501 09243W06BABA 1956REMSEN 3 (LAT 42 49 21N LONG 095 58 15W)										
MAY 1989										
25...	0.100	<20	100	1.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL										
20...	<0.100	--	--	0.54	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP										
19...	<0.100	--	--	0.48	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424948096332901 09348W31BDDC 1959AKRON 4 (LAT 42 49 48N LONG 096 33 29W)										
MAY 1989										
25...	0.100	<20	60	13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL										
19...	<0.100	--	--	1.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP										
19...	<0.100	--	--	0.71	<0.10	<0.10	<0.10	0.14	<0.10	<0.10
POLK COUNTY										
413342093432801 07825W15CAAC 1954WEST DES MOINES 9 (LAT 41 33 42N LONG 093 43 28W)										
MAY 1989										
22...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL										
25...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414051093190902 07821W05CAAA 09808 1958MITCHELLVILLE 2 (LAT 41 40 51N LONG 093 19 09W)										
MAY 1989										
23...	0.100	50	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL										
25...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
POWESHIEK COUNTY										
413449092223901 07813W08AACA				1940DEEP RIVER 1 (LAT 41 34 49N LONG 092 22 39W)						
JUL 1989 25...	0900	112PLSC	30	180	12.0	1350	7.30	560	150	45
414224092333201 08015W26DBDC				1979MALCOM 4 (LAT 41 42 24N LONG 092 33 32W)						
JUL 1989 25...	1000	330MSSP	93	120	13.5	1780	7.50	700	150	80
SAC COUNTY										
421501094522801 08635W24BBD				06210 1952AUBURN 3 (LAT 42 15 01N LONG 094 52 28W)						
JUL 1989 28...	1200	217DKOT	115	20	14.0	1500	7.30	670	180	54
421826095025101 08736W33BCAA				1978LAKE VIEW 3 (LAT 42 18 26N LONG 095 02 51W)						
MAY 1989 24...	1445	112PLSC	200	30	13.0	760	7.30	370	95	32
JUL 18...	1450	112PLSC	200	30	14.0	780	7.25	--	--	--
SEP 18...	1350	112PLSC	200	30	13.5	760	7.24	--	--	--
422447094594101 08836W26AAAC				1969SAC CITY 3 (LAT 42 24 47N LONG 094 59 41W)						
JUL 1989 28...	1045	112PLSC	515	60	14.0	860	7.20	440	120	35
422644095085501 08837W09DDAD				1973EARLY 2 (LAT 42 26 44N LONG 095 08 55W)						
MAY 1989 24...	1550	112PLSC	82	30	11.0	640	7.50	310	82	26
JUL 18...	1610	112PLSC	82	30	10.0	680	7.45	--	--	--
SEP 18...	1500	112PLSC	82	25	10.0	670	7.45	--	--	--
SCOTT COUNTY										
414251090523401 08001E20CC				1949NEW LIBERTY 1 (LAT 41 42 51N LONG 090 52 34W)						
JUL 1989 18...	0900	350SLRN	125	20	12.0	505	7.30	300	74	29
414422090464701 08002E18				1916DIXON 1 (LAT 41 44 22N LONG 090 46 47W)						
JUL 1989 18...	0800	112PLSC	60	20	12.0	610	7.20	300	71	31
SHELBY COUNTY										
413810095185401 07938W19BDDB				1981HARLAN 27 (LAT 41 38 10N LONG 095 18 54W)						
MAY 1989 31...	0920	111ALVM	72	30	13.0	700	7.25	340	100	23
JUL 14...	0945	111ALVM	72	30	11.5	690	7.20	--	--	--
414340095160301 08038W21ADAA				1972KIRKMAN 1 (LAT 41 43 40N LONG 095 16 03W)						
AUG 1989 17...	0915	111ALVM	5.0	30	16.0	780	7.20	410	100	38
SIOUX COUNTY										
425946096292901 09446W03AAAB				1960HAWARDEN 6 (LAT 42 59 46N LONG 096 29 29W)						
MAY 1989 25...	1230	110QRCU	170	30	12.5	1100	7.20	510	140	40
JUL 19...	1330	110QRCU	120	30	13.0	1070	7.30	--	--	--
SEP 19...	1045	110QRCU	170	30	13.0	1120	7.12	--	--	--

DATE	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
POWESHIEK COUNTY 413449092223901 07813W08AACA 1940DEEP RIVER 1 (LAT 41 34 49N LONG 092 22 39W)										
JUL 1989 25...	21	2.7	313	15	260	0.25	24	710	<0.100	2.60
414224092333201 08015W26DBDC 1979MALCOM 4 (LAT 41 42 24N LONG 092 33 32W)										
JUL 1989 25...	96	6.5	508	2.0	400	0.50	13	108	<0.100	11.0
SAC COUNTY 421501094522801 08635W24BBD 06210 1952AUBURN 3 (LAT 42 15 01N LONG 094 52 28W)										
JUL 1989 28...	71	5.0	398	3.5	400	0.45	24	1030	<0.100	1.30
421826095025101 08736W33BCAA 1978LAKE VIEW 3 (LAT 42 18 26N LONG 095 02 51W)										
MAY 1989 24...	13	2.0	288	14	73	0.20	28	456	8.90	<0.100
JUL 18...	--	--	--	--	--	--	--	--	8.20	<0.100
SEP 18...	--	--	--	--	--	--	--	--	8.80	<0.100
422447094594101 08836W26AAAC 1969SAC CITY 3 (LAT 42 24 47N LONG 094 59 41W)										
JUL 1989 28...	21	4.5	373	2.0	78	0.40	29	464	<0.100	1.20
422644095085501 08837W09DDAD 1973EARLY 2 (LAT 42 26 44N LONG 095 08 55W)										
MAY 1989 24...	11	1.9	256	12	30	0.25	17	330	9.60	<0.100
JUL 18...	--	--	--	--	--	--	--	--	9.70	<0.100
SEP 18...	--	--	--	--	--	--	--	--	9.60	<0.100
SCOTT COUNTY 414251090523401 08001E20CC 1949NEW LIBERTY 1 (LAT 41 42 51N LONG 090 52 34W)										
JUL 1989 18...	9.5	1.0	--	1.5	4.0	0.35	17	322	<0.100	<0.100
414422090464701 08002E18 1916DIXON 1 (LAT 41 44 22N LONG 090 46 47W)										
JUL 1989 18...	12	0.90	--	12	18	0.20	22	362	3.30	<0.100
SHELBY COUNTY 413810095185401 07938W19BDDB 1981HARLAN 27 (LAT 41 38 10N LONG 095 18 54W)										
MAY 1989 31...	10	2.5	264	19	90	0.25	16	424	<0.100	0.300
JUL 14...	--	--	--	--	--	--	--	--	<0.100	0.400
414340095160301 08038W21ADAA 1972KIRKMAN 1 (LAT 41 43 40N LONG 095 16 03W)										
AUG 1989 17...	10	3.0	360	18	44	0.35	25	--	2.70	0.500
SIOUX COUNTY 425946096292901 09448W03AAAB 1960HAWARDEN 6 (LAT 42 59 46N LONG 096 29 29W)										
MAY 1989 25...	27	7.9	294	24	210	0.20	27	752	8.90	<0.100
JUL 19...	--	--	--	--	--	--	--	--	6.70	0.100
SEP 19...	--	--	--	--	--	--	--	--	7.20	<0.100

DATE	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ATRA-ZINE, TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	METRI-BUZIN IN WHOLE WATER (UG/L) (81408)	ALA-CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA-CHLOR IN WHOLE WATER (UG/L) (39356)	BUTY-LATE (UG/L) (99901)	TRI-FLURA-LIN TOTAL RECOVER (UG/L) (39030)
				[Pesticide concentrations expressed as total recoverable]						
POWESHIEK COUNTY										
413449092223901 07813W08AACA 1940DEEP RIVER 1 (LAT 41 34 49N LONG 092 22 39W)										
JUL 1989 25...	0.200	3600	180	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414224092333201 08015W26DBDC 1979MALCOM 4 (LAT 41 42 24N LONG 092 33 32W)										
JUL 1989 25...	0.300	990	90	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
SAC COUNTY										
421501094522801 08635W24BBD 06210 1952AUBURN 3 (LAT 42 15 01N LONG 094 52 28W)										
JUL 1989 28...	<0.100	1300	970	<0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10
421826095025101 08736W33BCAA 1978LAKE VIEW 3 (LAT 42 18 26N LONG 095 02 51W)										
MAY 1989 24...	0.100	80	40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 18...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 18...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422447094594101 08836W26AAAC 1969SAC CITY 3 (LAT 42 24 47N LONG 094 59 41W)										
JUL 1989 28...	<0.100	2400	170	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422644095085501 08837W09DDAD 1973EARLY 2 (LAT 42 26 44N LONG 095 08 55W)										
MAY 1989 24...	0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
JUL 18...	<0.100	--	--	0.17	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP 18...	<0.100	--	--	0.17	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SCOTT COUNTY										
414251090523401 08001E20CC 1949NEW LIBERTY 1 (LAT 41 42 51N LONG 090 52 34W)										
JUL 1989 18...	<0.100	590	140	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414422090464701 08002E18 1916DIXON 1 (LAT 41 44 22N LONG 090 46 47W)										
JUL 1989 18...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SHELBY COUNTY										
413810095185401 07938W19BDDB 1981HARLAN 27 (LAT 41 38 10N LONG 095 18 54W)										
MAY 1989 31...	<0.100	6900	1400	0.20	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 14...	<0.100	--	--	0.24	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
414340095160301 08038W21ADAA 1972KIRKMAN 1 (LAT 41 43 40N LONG 095 16 03W)										
AUG 1989 17...	0.100	620	320	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SIOUX COUNTY										
425946096292901 09448W03AAAB 1960HAWARDEN 6 (LAT 42 59 46N LONG 096 29 29W)										
MAY 1989 25...	0.200	<20	<20	9.9	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 19...	0.100	--	--	9.2	<0.10	<0.10	<0.10	0.14	<0.10	<0.10
SEP 19...	0.200	--	--	9.8	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN) (72004)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
SIOUX COUNTY										
430459096061901 09545W01ABBC 1860SIOUX CENTER 5 (LAT 43 04 59N LONG 096 06 19W)										
AUG 1989 03...	1000	110QRNR	180	30	10.5	970	7.20	510	130	44
431228096173801 09746W21BCCC 1977ROCK VALLEY 6 (LAT 43 12 28N LONG 096 17 38W)										
AUG 1989 03...	0815	112PLSC	150	45	18.0	990	7.50	520	140	42
TAMA COUNTY										
415852092424901 08316W21DCAB 1970MONTOUR 2 (LAT 41 58 52N LONG 092 42 49W)										
JUN 1989 01...	1430	112PLSC	--	15	12.0	605	7.11	300	85	21
AUG 09...	1130	112PLSC	--	5	11.0	575	6.53	--	--	--
421135092275002 08514W10ABCD 1894TRAER 2 (LAT 42 11 35N LONG 092 27 50W)										
AUG 1989 09...	1000	344CDVL	--	20	11.0	1600	7.38	780	200	69
TAYLOR COUNTY										
404454094372901 06933W27ADDD 1971CONWAY 1 (LAT 40 44 54N LONG 094 37 29W)										
MAY 1989 31...	1600	112PLSC	6.0	30	12.5	760	6.60	330	96	23
JUL 17...	1500	112PLSC	12	30	15.0	730	6.60	--	--	--
SEP 28...	1600	112PLSC	12	20	17.0	790	6.68	--	--	--
VAN BUREN COUNTY										
403844091442901 06808W35DABB 1941FARMINGTON 1 (LAT 40 38 44N LONG 091 44 29W)										
JUN 1989 02...	1135	112PLSC	--	5	13.0	980	7.18	510	140	40
JUL 24...	1140	112PLSC	150	5	12.5	950	7.42	--	--	--
403926092094902 06811W30AACB 1967MILTON 3 (LAT 40 39 26N LONG 092 09 49W)										
JUL 1989 24...	1310	112PLSC	45	35	12.0	1290	7.42	540	140	47
410907092375101 07315W06CADD 1970EDDYVILLE 2 (LAT 41 09 07N LONG 092 37 51W)										
JUN 1989 02...	0735	112PLSC	120	15	12.0	705	6.99	360	100	26
JUL 26...	1300	112PLSC	--	10	13.5	672	7.40	--	--	--
WARREN COUNTY										
411806093440501 07525W16ADCA 1979SAINT MARYS 2 (LAT 41 18 06N LONG 093 44 05W)										
MAY 1989 23...	1415	112PLSC	55	15	11.0	400	7.30	180	47	15
JUL 26...	0830	112PLSC	21	15	15.5	408	7.20	--	--	--
WASHINGTON COUNTY										
412013091485701 07608W31DDCC 08701 1957WEST CHESTER 1 (LAT 41 20 13N LONG 091 48 57W)										
JUL 1989 24...	0900	339WSVL	120	10	12.0	790	7.30	360	75	42
412856091430601 07708W13AABB 1972KALONA 3 (LAT 41 28 56N LONG 091 43 06W)										
JUL 1989 25...	1010	112PLSC	--	--	12.5	600	7.02	300	69	32

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
SIOUX COUNTY										
430459096061901 09545W01ABBC 1960SIOUX CENTER 5 (LAT 43 04 59N LONG 096 06 19W)										
AUG 1989										
03...	20	2.7	301	22	200	0.50	19	--	4.10	0.200
431228096173801 09746W21BCCC 1977ROCK VALLEY 6 (LAT 43 12 28N LONG 096 17 38W)										
AUG 1989										
03...	16	4.8	297	20	210	0.25	22	--	8.80	<0.100
TAMA COUNTY										
415852092424901 08316W21DCAB 1970MONTOUR 2 (LAT 41 58 52N LONG 092 42 49W)										
JUN 1989										
01...	11	1.7	--	15	46	0.20	19	282	6.20	<0.100
AUG										
09...	--	--	228	--	--	--	--	--	4.90	<0.100
421135092275002 08514W10ABCD 1894TRAER 2 (LAT 42 11 35N LONG 092 27 50W)										
AUG 1989										
09...	82	4.6	--	5.0	680	0.75	14	1350	<0.100	4.70
TAYLOR COUNTY										
404454094372901 06933W27ADDD 1971CONWAY 1 (LAT 40 44 54N LONG 094 37 29W)										
MAY 1989										
31...	26	1.4	184	26	170	0.15	24	494	0.500	0.800
JUL										
17...	--	--	--	--	--	--	--	--	0.300	0.800
SEP										
28...	--	--	--	--	--	--	--	--	0.100	1.20
VAN BUREN COUNTY										
403844091442901 06808W35DABB 1941FARMINGTON 1 (LAT 40 38 44N LONG 091 44 29W)										
JUN 1989										
02...	18	1.4	--	14	230	0.55	22	646	4.00	<0.100
JUL										
24...	--	--	260	--	--	--	--	--	3.80	<0.100
403926092094902 06811W30AACB 1967MILTON 3 (LAT 40 39 26N LONG 092 09 49W)										
JUL 1989										
24...	77	5.3	--	3.0	180	0.20	26	768	<0.100	5.70
410907092375101 07315W06CADD 1970EDDYVILLE 2 (LAT 41 09 07N LONG 092 37 51W)										
JUN 1989										
02...	9.0	1.4	--	16	110	0.50	16	399	2.40	<0.100
JUL										
26...	--	--	--	--	--	--	--	--	2.50	<0.100
WARREN COUNTY										
411806093440501 07525W16ADCA 1979SAINT MARYS 2 (LAT 41 18 06N LONG 093 44 05W)										
MAY 1989										
23...	10	0.30	--	4.5	20	0.30	31	224	8.20	<0.100
JUL										
26...	--	--	--	--	--	--	--	--	8.40	<0.100
WASHINGTON COUNTY										
412013091485701 07608W31DDCC 08701 1957WEST CHESTER 1 (LAT 41 20 13N LONG 091 48 57W)										
JUL 1989										
24...	54	2.9	384	2.0	67	0.30	12	464	<0.100	2.00
412856091430601 07708W13AABB 1972KALONA 3 (LAT 41 28 56N LONG 091 43 06W)										
JUL 1989										
25...	17	0.70	--	35	81	0.25	21	362	0.100	0.200

DATE	PHOSPHOROUS ORTHO, DISSOLVED (MG/L AS P)	IRON, DISSOLVED (UG/L AS FE)	MANGANESE, DISSOLVED (UG/L AS MN)	ATRAZINE, TOTAL (UG/L)	CYANAZINE TOTAL (UG/L)	METRIBUZIN IN WHOLE WATER (UG/L)	ALACHLOR TOTAL RECOVER (UG/L)	METOLACHLOR IN WHOLE WATER (UG/L)	BUTYLATE (UG/L)	TRIFLURALIN TOTAL RECOVER (UG/L)
				[Pesticide concentrations expressed as total recoverable]						
	(00671)	(01046)	(01056)	(39630)	(81757)	(81408)	(77825)	(39356)	(99901)	(39030)
SIOUX COUNTY										
430459096061901 09545W01ABBC 1960SIOUX CENTER 5 (LAT 43 04 59N LONG 096 06 19W)										
AUG 1989 03...	<0.100	2400	980	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
431228096173801 09746W21BCCC 1977ROCK VALLEY 6 (LAT 43 12 28N LONG 096 17 38W)										
AUG 1989 03...	0.100	600	<20	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10
TAMA COUNTY										
415852092424901 08316W21DCAB 1970MONTOUR 2 (LAT 41 58 52N LONG 092 42 49W)										
JUN 1989 01...	<0.100	<20	30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
AUG 09...	<0.100	--	--	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
421135092275002 08514W10ABCD 1894TRAER 2 (LAT 42 11 35N LONG 092 27 50W)										
AUG 1989 09...	<0.100	1700	100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
TAYLOR COUNTY										
404454094372901 06933W27ADDD 1971CONWAY 1 (LAT 40 44 54N LONG 094 37 29W)										
MAY 1989 31...	<0.100	17000	2500	0.87	<0.10	<0.10	1.30	<0.10	<0.10	<0.10
JUL 17...	0.100	--	--	1.0	<0.10	<0.10	1.10	<0.10	<0.10	<0.10
SEP 28...	<0.100	--	--	0.14	<0.10	<0.10	0.30	<0.10	<0.10	<0.10
VAN BUREN COUNTY										
403844091442901 06808W35DABB 1941FARMINGTON 1 (LAT 40 38 44N LONG 091 44 29W)										
JUN 1989 02...	<0.100	20	40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 24...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
403926092094902 06811W30AACB 1967MILTON 3 (LAT 40 39 26N LONG 092 09 49W)										
JUL 1989 24...	0.400	310	40	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
410907092375101 07315W06CADD 1970EDDYVILLE 2 (LAT 41 09 07N LONG 092 37 51W)										
JUN 1989 02...	<0.100	60	100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 26...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
WARREN COUNTY										
411806093440501 07525W16ADCA 1979SAINT MARYS 2 (LAT 41 18 06N LONG 093 44 05W)										
MAY 1989 23...	0.200	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL 26...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
WASHINGTON COUNTY										
412013091485701 07608W31DDCC 08701 1957WEST CHESTER 1 (LAT 41 20 13N LONG 091 48 57W)										
JUL 1989 24...	<0.100	120	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
412856091430601 07708W13AABB 1972KALONA 3 (LAT 41 28 56N LONG 091 43 06W)										
JUL 1989 25...	0.100	100	200	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

DATE	TIME	GEO-LOGIC UNIT	FLOW RATE (G/M) (00058)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN) (72004)	TEMPERATURE WATER (DEG C) (00010)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)
WEBSTER COUNTY 423512094202201 09030W25BBAA 1956CLARE 1 (LAT 42 35 12N LONG 094 20 22W)										
AUG 1989 07...	1615	210CRCS	45	60	12.0	1000	7.00	460	120	38
WINNEBAGO COUNTY 431556093375401 09824W26DDCC 00304 1934FOREST CITY 2 (LAT 43 15 56N LONG 093 37 54W)										
AUG 1989 03...	1115	344CDVL	850	60	10.0	730	7.50	380	98	32
WOODBURY COUNTY 421405095433001 08642W27BCDA 1939DANBURY 3 (LAT 42 14 05N LONG 095 43 30W)										
MAY 1989 26...	1335	111ALVM	180	30	12.0	850	7.20	420	110	35
JUL 18...	0945	111ALVM	180	30	12.0	870	7.30	--	--	--
SEP 20...	1130	111ALVM	180	30	14.0	880	7.17	--	--	--
422759095402502 08842W01ADCC 1959CUSHING 2 (LAT 42 27 59N LONG 095 40 25W)										
MAY 1989 26...	1200	111ALVM	90	30	11.5	760	7.40	360	99	27
JUL 20...	1200	111ALVM	90	30	13.5	750	7.35	--	--	--
SEP 20...	1000	111ALVM	90	30	12.0	800	7.25	--	--	--
422848096104301 08945W32DBDA 1971LAWTON 4 (LAT 42 28 48N LONG 096 10 43W)										
AUG 1989 11...	1020	217DKOT	95	30	13.0	600	7.35	300	81	23
423242095521501 08943W12BADB 1920PIERSON 1 (LAT 42 32 42N LONG 095 52 15W)										
MAY 1989 26...	1025	111ALVM	90	20	10.0	820	7.20	380	100	31
JUL 20...	1045	111ALVM	90	30	10.5	780	7.30	--	--	--
SEP 20...	0900	111ALVM	90	20	10.0	800	7.25	--	--	--
WRIGHT COUNTY 424135093362801 09123W18DBCA 1945GALT 1 (LAT 42 41 35N LONG 093 36 28W)										
JUL 1989 31...	1400	112PLSC	80	15	12.5	700	7.50	360	94	30
424415093500101 09225W31DADA 1946HOLMES 1 (LAT 42 44 15N LONG 093 50 01W)										
AUG 1989 02...	0945	330MSSP	--	20	18.5	760	7.20	380	100	32
424422093324001 09223W34ACC 02929 1947ROWAN 1 (LAT 42 44 22N LONG 093 32 40W)										
JUL 1989 31...	1255	339KDRK	60	20	12.0	700	7.50	340	91	27
425058093363901 09323W19CDCC 09241 1958BELMOND 2 (LAT 42 50 58N LONG 093 36 39W)										
JUL 1989 31...	1150	339HMPN	500	60	14.0	680	7.40	340	89	28

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
WEBSTER COUNTY 423512094202201 09030W25BBAA 1956CLARE 1 (LAT 42 35 12N LONG 094 20 22W)										
AUG 1989 07...	30	5.1	390	18	180	0.75	13	656	<0.100	0.300
WINNEBAGO COUNTY 431556093375401 09824W26DDCC 00304 1934FOREST CITY 2 (LAT 43 15 56N LONG 093 37 54W)										
AUG 1989 03...	16	3.2	368	1.5	44	0.35	22	428	<0.100	0.800
WOODBURY COUNTY 421405095433001 08642W27BCDA 1939DANBURY 3 (LAT 42 14 05N LONG 095 43 30W)										
MAY 1989 26...	11	3.5	326	19	51	0.25	26	500	14.0	<0.100
JUL 18...	--	--	--	--	--	--	--	--	14.0	<0.100
SEP 20...	--	--	--	--	--	--	--	--	15.0	<0.100
422759095402502 08842W01ADCC 1959CUSHING 2 (LAT 42 27 59N LONG 095 40 25W)										
MAY 1989 26...	12	0.90	270	15	64	0.40	21	456	13.0	<0.100
JUL 20...	--	--	--	--	--	--	--	--	12.0	<0.100
SEP 20...	--	--	--	--	--	--	--	--	11.0	<0.100
422848096104301 08945W32DBDA 1971LAWTON 4 (LAT 42 28 48N LONG 096 10 43W)										
AUG 1989 11...	12	4.0	314	2.0	6.8	0.35	24	--	<0.100	<0.100
423242095521501 08943W12BADB 1920PIERSON 1 (LAT 42 32 42N LONG 095 52 15W)										
MAY 1989 26...	16	1.6	298	14	68	0.40	24	510	14.0	<0.100
JUL 20...	--	--	--	--	--	--	--	--	14.0	<0.100
SEP 20...	--	--	--	--	--	--	--	--	16.0	<0.100
WRIGHT COUNTY 424135093362801 09123W18DBCA 1945GALT 1 (LAT 42 41 35N LONG 093 36 28W)										
JUL 1989 31...	7.5	3.7	354	3.5	16	0.30	26	328	<0.100	0.300
424415093500101 09225W31DADA 1946HOLMES 1 (LAT 42 44 15N LONG 093 50 01W)										
AUG 1989 02...	30	3.9	380	4.5	60	0.25	23	472	0.100	0.300
424422093324001 09223W34ACC 02929 1947ROWAN 1 (LAT 42 44 22N LONG 093 32 40W)										
JUL 1989 31...	16	1.8	372	3.0	7.1	0.40	13	252	<0.100	0.800
425058093363901 09323W19CDCC 09241 1958BELMOND 2 (LAT 42 50 58N LONG 093 36 39W)										
JUL 1989 31...	16	1.5	346	5.5	26	0.30	17	358	<0.100	1.00

[Pesticide concentrations expressed as total recoverable]

DATE	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	ATRA-ZINE, TOTAL (UG/L) (39630)	CYAN-AZINE TOTAL (UG/L) (81757)	METRI-BUZIN IN WHOLE WATER (UG/L) (81408)	ALA-CHLOR TOTAL RECOVER (UG/L) (77825)	METOLA-CHLOR IN WHOLE WATER (UG/L) (39356)	BUTY-LATE (UG/L) (99901)	TRI-FLURA-LIN TOTAL RECOVER (UG/L) (39030)
WEBSTER COUNTY										
423512094202201 09030W25BBAA 1956CLARE 1 (LAT 42 35 12N LONG 094 20 22W)										
AUG 1989										
07...	<0.100	670	280	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
WINNEBAGO COUNTY										
431556093375401 09824W26DDCC 00304 1934FOREST CITY 2 (LAT 43 15 56N LONG 093 37 54W)										
AUG 1989										
03...	<0.100	1200	60	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
WOODBURY COUNTY										
421405095433001 08642W27BCDA 1939DANBURY 3 (LAT 42 14 05N LONG 095 43 30W)										
MAY 1989										
26...	0.200	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
JUL										
18...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP										
20...	0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422759095402502 08842W01ADCC 1959CUSHING 2 (LAT 42 27 59N LONG 095 40 25W)										
MAY 1989										
26...	<0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
JUL										
20...	1.40	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP										
20...	0.400	--	--	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
422848096104301 08945W32DBDA 1971LAWTON 4 (LAT 42 28 48N LONG 096 10 43W)										
AUG 1989										
11...	<0.100	250	310	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
423242095521501 08943W12BADB 1920PIERSON 1 (LAT 42 32 42N LONG 095 52 15W)										
MAY 1989										
26...	0.100	<20	<20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
JUL										
20...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
SEP										
20...	<0.100	--	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
WRIGHT COUNTY										
424135093362801 09123W18DBCA 1945GALT 1 (LAT 42 41 35N LONG 093 36 28W)										
JUL 1989										
31...	<0.100	750	170	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424415093500101 09225W31DADA 1946HOLMES 1 (LAT 42 44 15N LONG 093 50 01W)										
AUG 1989										
02...	<0.100	30	500	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
424422093324001 09223W34ACC 02929 1947ROWAN 1 (LAT 42 44 22N LONG 093 32 40W)										
JUL 1989										
31...	0.200	1800	60	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
425058093363901 09323W19CDCC 09241 1958BELMOND 2 (LAT 42 50 58N LONG 093 36 39W)										
JUL 1989										
31...	0.100	1300	120	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

MCNAY RESEARCH STATION NEAR CHARITON, IOWA

LOCATION.--Lat 40°57'47", long 93°23'34", in SW1/4 NE1/4 sec. 9, T.71 N., R.23 W., Lucas County, Hydrologic Unit 10280201, 3.1 mi east and 2.0 mi north of Derby, Iowa, 3.4 mi west and 2.8 mi south of Chariton, Iowa.

OWNER.--U.S. Geological Survey.

PERIOD OF RECORD.--September 1984 to current year.

INSTRUMENTATION.--Wet/dry precipitation collector, weighing-bucket type recording rain gage with alter wind shield and event recorder. National Weather Service standard 8-inch rain and snow gage (back-up only).

REMARKS.--Samples marked with an asterik (*) were dry or contained little water. Fifty (50) ml of dilution water was added to the sample bucket to dissolve dry precipitate and then analyzed.

EXTREMES FOR PERIOD OF RECORD.--Maximum field pH, 7.07, April 19 to April 26, 1988; minimum field pH, 3.84, February 12 to February 19, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum field pH, 6.29, April 11 to April 18, 1989; minimum field pH, 4.17, August 15 to August 22, 1989.

WET DEPOSITION DATA

DATE	PH (STAND-ARD UNITS) (00400)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
OCT 04-11	--	--	--	--	--	--	--	--	--	--	--
OCT 11-18	--	--	--	--	--	--	--	--	--	--	--
OCT 18-25	5.11	13.7	0.772	0.050	0.028	0.062	0.202	0.413	0.12	1.98	<0.007
*OCT 25- NOV 01	--	--	0.009	<0.003	<0.003	0.003	<0.016	<0.007	0.04	<0.03	0.020
NOV 01-08	5.06	15.9	0.595	0.034	0.037	0.099	0.692	0.535	0.13	1.63	<0.007
NOV 08-15	4.41	26.3	0.397	0.026	0.021	0.061	0.350	0.373	0.09	2.66	<0.007
NOV 15-22	5.06	7.0	0.117	0.015	0.005	0.104	0.047	0.102	0.12	0.78	<0.007
NOV 22-29	4.82	14.9	0.363	0.025	0.015	0.045	0.373	0.253	0.06	1.82	<0.007
NOV 29- DEC 06	--	--	--	--	--	--	--	--	--	--	--
DEC 06-13	--	--	--	--	--	--	--	--	--	--	--
DEC 13-20	5.91	25.6	3.550	0.224	0.256	0.337	0.717	0.708	0.33	3.69	<0.007
DEC 20-27	5.62	16.3	0.315	0.027	0.022	0.092	0.233	0.428	0.15	1.51	<0.007
DEC 27 1988- JAN 03 1989	--	--	--	--	--	--	--	--	--	--	--
JAN 03-10	4.39	27.2	0.244	0.018	0.029	0.053	0.482	0.408	0.07	2.97	<0.007
JAN 10-17	--	--	0.883	0.074	0.063	0.502	1.680	0.892	0.30	5.55	<0.007
JAN 17-24	--	--	--	--	--	--	--	--	--	--	--
JAN 24-31	4.80	8.8	0.121	0.006	<0.003	0.028	0.124	0.186	0.04	0.75	<0.007
*JAN 31- FEB 07	--	--	0.230	0.025	<0.015	0.445	<0.078	<0.033	0.20	<0.15	<0.033
FEB 07-14	5.06	5.0	0.041	0.006	<0.003	0.019	<0.016	<0.007	0.04	0.19	0.013
FEB 14-21	4.42	20.4	0.175	0.012	<0.003	0.056	0.101	0.693	0.08	0.75	<0.016
FEB 21-28	--	--	--	--	--	--	--	--	--	--	--
FEB 28- MAR 07	4.32	35.9	0.872	0.102	0.034	0.185	0.661	0.779	0.33	4.85	<0.007
MAR 07-14	--	--	--	--	--	--	--	--	--	--	--
MAR 19-23	--	--	--	--	--	--	--	--	--	--	--
MAR 23-28	5.44	7.0	0.227	0.016	0.011	0.220	0.249	0.266	0.09	0.61	<0.007
*MAR 28- APR 04	--	--	0.087	0.006	0.005	0.030	<0.016	0.018	0.04	0.11	<0.007
APR 04-11	5.53	12.7	0.302	0.023	0.016	0.108	0.949	0.382	0.09	1.63	<0.007
APR 11-18	6.29	20.7	1.275	0.123	0.039	0.153	1.463	0.551	0.14	2.24	<0.007
*APR 18-25	--	--	0.286	0.016	0.015	0.058	<0.016	<0.007	0.04	0.19	<0.007

MCNAY RESEARCH STATION NEAR CHARITON, IOWA

WET DEPOSITION DATA

DATE	PH (STAND-ARD UNITS) (00400)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
APR 25-MAY 02	5.23	9.8	0.322	0.024	0.024	0.064	0.140	0.262	0.08	1.49	<0.007
MAY 02-09	5.56	10.7	0.705	0.057	0.031	0.030	0.490	0.440	0.07	1.47	<0.007
*MAY 09-16	--	--	0.011	<0.003	<0.003	0.032	0.031	0.011	0.03	0.05	<0.007
MAY 16-23	4.66	15.9	0.263	0.035	0.073	0.069	0.303	0.260	0.12	1.97	<0.007
MAY 23-30	5.12	5.5	0.181	0.019	0.028	0.077	0.140	0.113	0.11	0.69	<0.007
MAY 30-JUN 06	5.17	11.5	0.505	0.060	0.048	0.157	0.537	0.422	0.18	1.63	<0.007
JUN 06-13	4.55	18.4	0.208	0.026	0.098	0.026	0.443	0.271	0.08	2.26	<0.007
JUN 13-20	5.31	21.1	1.294	0.079	0.067	0.057	1.120	0.704	0.17	3.78	<0.007
JUN 20-27	5.10	18.1	0.768	0.081	0.116	0.123	0.731	0.522	0.26	2.81	<0.007
*JUN 27-JUL 04	--	--	1.251	0.051	0.244	0.122	0.521	0.198	0.22	0.58	0.127
*JUL 04-11	--	--	4.451	0.390	0.417	0.526	<0.140	0.544	1.18	2.54	<0.059
JUL 11-18	4.85	9.7	0.212	0.022	0.029	0.036	0.226	0.204	0.09	1.08	<0.007
JUL 18-25	4.61	18.0	0.350	0.029	0.015	0.015	0.381	0.326	0.07	2.15	<0.007
JUL 25-AUG 01	4.72	16.0	0.503	0.029	0.020	0.046	0.389	0.588	0.12	1.40	<0.007
*AUG 01-08	--	--	0.148	<0.013	0.423	0.187	<0.070	<0.029	0.52	1.74	<0.028
AUG 08-15	4.52	33.5	1.500	0.082	0.053	0.074	0.871	0.482	0.14	5.73	<0.007
AUG 15-22	4.17	44.5	0.575	0.046	0.059	0.102	0.840	0.777	0.21	5.26	<0.007
AUG 22-29	4.77	10.3	0.146	0.011	0.009	0.041	0.179	0.244	0.07	0.75	<0.007
AUG 29-SEP 05	4.46	18.0	0.167	0.016	0.010	0.050	0.202	0.324	0.10	1.68	<0.007
SEP 05-12	4.84	7.7	0.073	0.005	0.005	0.027	0.117	0.151	0.07	0.65	<0.007
SEP 12-19	5.03	6.5	0.348	0.040	<0.003	0.208	0.070	0.124	0.16	0.74	0.016
SEP 19-26	--	--	--	--	--	--	--	--	--	--	--
SEP 26-OCT 03	--	--	--	--	--	--	--	--	--	--	--

BIG SPRING FISH HATCHERY NEAR ELKADER, IOWA

LOCATION.--Lat 42°54'35", long 91°28'11", in SE1/4 SE1/4 sec. 31, T.94 N., R.5 W., Clayton County, Hydrologic Unit 07060004, 3.0 mi north and 2.8 mi west of Elkader, Iowa.

OWNER.--U.S. Geological Survey.

PERIOD OF RECORD.--August 1984 to current year.

INSTRUMENTATION.--Wet/dry precipitation collector, weighing-bucket type recording rain gage with alter wind shield and event recorder and National Weather Service standard 8-inch rain and snow gage (back-up only).

REMARKS.--Samples marked with an asterik (*) were dry or contained little water. Fifty (50) ml of dilution water was added to the sample bucket to dissolve dry precipitate and then analyzed.

EXTREMES FOR PERIOD OF RECORD.--Maximum field pH, 6.98, May 5 to May 12, 1987; minimum field pH, 3.83, July 30 to August 6, 1985.

EXTREMES FOR CURRENT YEAR.--Maximu field pH, 6.87 May 30 to June 6, 1989; minimum field pH, 3.98, March 14 to March 21, 1989.

WET DEPOSITION DATA

DATE	PH (STAND-ARD UNITS) (00400)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
OCT 04-11	--	--	--	--	--	--	--	--	--	--	--
OCT 11-18	--	--	0.439	0.076	0.033	0.043	0.265	0.249	0.06	1.14	<0.007
OCT 18-25	--	--	0.431	0.048	0.054	0.051	0.638	0.515	0.14	2.79	<0.007
OCT 25- NOV 01	--	--	--	--	--	--	--	--	--	--	--
NOV 01-08	--	--	0.329	0.047	0.028	0.072	0.724	0.497	0.10	1.59	<0.007
NOV 08-15	--	--	2.694	1.000	3.420	0.080	0.086	0.329	0.52	1.95	<0.007
NOV 15-22	--	--	0.310	0.081	0.021	0.045	0.093	0.109	0.06	0.85	<0.007
NOV 22-29	--	--	0.639	0.108	0.032	0.043	0.918	0.786	0.13	2.71	<0.007
NOV 29- DEC 05	--	16.3	1.825	0.200	0.051	0.178	0.513	0.766	0.31	1.33	0.018
DEC 06-13	--	--	--	--	--	--	--	--	--	--	--
DEC 13-20	5.87	25.1	2.262	0.177	0.158	0.168	0.840	0.071	0.21	3.69	<0.007
DEC 20-27	--	--	0.294	0.048	0.029	0.115	0.584	0.548	0.25	3.12	<0.007
DEC 27 1988- JAN 03 1989	--	--	--	--	--	--	--	--	--	--	--
JAN 03-10	4.62	15.4	0.129	0.014	0.017	0.021	0.303	0.244	0.06	1.75	<0.007
JAN 10-17	4.10	43.5	0.190	0.025	0.083	0.103	0.809	0.750	0.36	4.37	<0.007
JAN 17-24	--	--	--	--	--	--	--	--	--	--	--
JAN 24-31	4.46	25.8	0.146	0.020	0.011	0.066	0.856	0.648	0.14	3.00	<0.007
*JAN 31- FEB 07	--	--	0.969	0.121	0.179	0.674	<0.078	0.226	0.48	0.63	<0.032
FEB 07-14	5.29	3.5	0.145	0.021	0.010	0.068	<0.016	<0.007	0.05	0.17	<0.007
FEB 14-21	5.44	7.3	0.421	0.072	0.080	0.125	0.226	0.393	0.24	0.49	<0.007
*FEB 21-28	--	--	2.289	0.169	0.259	0.359	0.778	0.375	0.39	2.32	<0.020
FEB 28- MAR 07	4.25	35.6	0.626	0.084	0.011	0.122	0.397	0.766	0.21	3.39	<0.007
MAR 07-14	--	--	1.302	0.207	0.728	0.861	4.614	3.170	1.41	14.28	0.039
MAR 14-21	3.98	79.5	0.413	0.049	0.060	0.188	3.299	1.523	0.20	10.85	<0.007
MAR 21-28	5.58	10.9	0.490	0.076	0.132	0.222	0.513	0.224	0.19	1.20	<0.007
MAR 28- APR 04	6.11	37.4	0.875	0.179	0.049	0.097	1.774	0.531	0.16	3.36	<0.007
APR 04-11	6.45	28.8	3.950	0.320	0.594	0.654	1.019	0.686	0.86	2.79	<0.007
APR 11-18	6.78	18.2	3.560	0.366	0.181	0.248	1.151	0.730	0.31	3.14	<0.007
APR 18-25	6.65	31.3	0.982	0.119	0.060	0.083	1.307	0.653	0.13	3.38	<0.007

BIG SPRINGS FISH HATCHERY NEAR ELKADER, IOWA

WET DEPOSITION DATA

DATE	PH (STAND-ARD UNITS) (00400)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)
APR 25- MAY 02	5.81	18.6	0.824	0.091	0.051	0.092	1.027	0.619	0.14	2.86	<0.007
MAY 02-09	5.15	16.7	0.291	0.068	0.030	0.052	0.739	0.380	0.07	2.25	<0.007
*MAY 09-16	--	--	0.109	0.019	0.010	0.029	0.070	0.033	0.07	0.19	<0.007
MAY 16-23	5.04	18.8	0.480	0.155	0.177	0.116	0.584	0.391	0.15	3.52	<0.007
MAY 23-30	5.98	15.6	0.938	0.121	0.176	0.227	0.506	0.420	0.25	2.07	<0.007
MAY 30- JUN 06	6.87	38.4	4.270	0.617	0.165	0.110	0.700	1.066	0.21	1.92	<0.007
JUN 06-13	4.87	13.1	0.150	0.031	0.031	0.021	0.630	0.329	0.06	1.70	<0.007
*JUN 13-20	--	--	0.013	<0.003	0.003	0.012	0.109	0.007	0.03	<0.03	<0.007
JUN 20-27	5.81	9.8	0.514	0.099	0.034	0.035	0.576	0.275	0.07	1.61	<0.007
*JUN 27- JUL 04	--	--	0.034	0.004	0.006	0.055	0.202	0.011	0.11	0.04	0.010
*JUL 04-11	--	--	4.938	0.255	0.165	0.232	0.755	0.981	0.52	2.70	<0.049
JUL 11-18	5.92	15.5	1.187	0.244	0.043	0.054	0.506	0.324	0.12	2.31	<0.007
JUL 18-25	4.49	29.7	0.273	0.086	0.027	0.014	0.630	0.517	0.08	4.12	<0.007
JUL 25- AUG 01	5.63	14.7	1.132	0.305	0.030	0.039	0.296	0.599	0.15	2.44	<0.007
AUG 01-08	6.08	15.6	0.638	0.072	0.031	0.094	0.716	0.389	0.11	1.19	<0.007
*AUG 08-15	--	--	6.126	0.688	0.223	0.162	1.891	2.171	0.61	17.88	0.154
AUG 15-22	4.33	27.9	0.250	0.070	0.022	0.026	0.685	0.517	0.09	4.03	<0.007
AUG 22-29	6.04	9.4	0.428	0.074	0.019	0.033	0.622	0.293	0.08	1.23	<0.007
AUG 29- SEP 05	4.70	10.8	0.184	0.019	0.015	0.029	0.358	0.218	0.07	1.42	<0.007
SEP 05-12	4.73	12.2	0.111	0.018	0.023	0.036	0.288	0.246	0.10	1.45	<0.007
SEP 12-19	6.56	10.7	1.670	0.195	0.003	0.115	<0.016	0.129	0.15	1.14	<0.007
SEP 19-26	4.64	16.2	0.201	0.027	0.032	0.040	0.381	0.191	0.08	2.02	<0.007
SEP 26- OCT 03	--	--	--	--	--	--	--	--	--	--	--

Page

Acre-foot, definition of...................... 48
Aquifer, definition of....................... 48
Artesian, definition of...................... 48

Bacteria, definition of...................... 48
Beaver Creek (tributary to Iowa River) at New Hartford.............................. 107, 251
Beaver Creek (tributary to Des Moines River) near Grimes............................ 148, 254
Bed material, definition of.................. 48
Big Bear Creek at Ladora..................... 90, 249
Big Cedar Creek near Varina.................. 150, 254
Big Sioux River at Akron..................... 177
Big Sioux River basin, crest-stage partial-record stations in...................... 239
  gaging-station records in.................. 176, 177
Big Springs Fish Hatchery near Elkader, Precipitation Water Quality, data for.. 395, 396
Black Hawk Creek at Hudson................... 110, 251
Black Hawk Lake at Lake View................. 152
Boone River near Webster City................ 141, 253
Bottom material, definition of............... 48
Boyer River at Denison....................... 259
Boyer River at Logan......................... 197, 259
Boyer River basin, crest-stage partial-record stations in...................... 240
  gaging-station records in.................. 197

Cedar Creek (tributary to Des Moines River) near Bussey............................ 173, 256
Cedar Creek (tributary to Skunk River) near Oakland Mills...................... 129, 253
Cedar River near Austin, Minnesota........... 245, 246
Cedar River Basin, discharge measurements in. 245, 246
Cedar River, at Cedar Rapids................. 112, 252
  at Cedar Falls............................. 108, 109
  at Charles City............................ 100, 250
  at Janesville.............................. 102, 251
  Little Cedar, near Ionia................... 101, 250
  at Waterloo................................ 111, 252
  near Conesville............................ 113, 252
  West Fork, at Finchford.................... 103, 251
Chariton River, near Chariton................ 229, 262
  near Moulton............................... 233, 262
  near Rathbun............................... 232, 262
  South Fork, near Promise City.............. 230, 262
Chariton River basin, crest-stage partial-record stations in...................... 241
  gaging-station records in.................. 229-233
Clear Creek near Coralville.................. 94, 249
Clear Lake at Clear Lake..................... 105
Contents, definition of...................... 49
Control, definition of....................... 49
Control structure, definition of............. 49
Cooperation.................................. 2
Coralville Lake near Coralville.............. 92
Crest-stage stations, maximum stage and discharge, made at partial-record stations in............................ 234-241
Crow Creek, at Bettendorf.................... 77, 248
Crow Creek basin
  gaging-stations in......................... 77
Cubic feet per second per square mile, definition of........................ 49
Cubic foot per second, definition of......... 49
Cubic foot per second day.................... 48

Definition of terms.......................... 48-56
Des Moines River, at Estherville............. 137, 253
  East Fork, at Dakota City.................. 139, 253
  at Fort Dodge.............................. 140, 253
  at Humboldt................................ 138, 253
  at Keosauqua............................... 175, 257
  at Ottumwa................................. 174, 256
  below Raccoon River, at Des Moines......... 163, 255
  near Runnells.............................. 168, 256
  near Saylorville........................... 144-147
  near Stratford............................. 142, 254
  near Tracy................................. 172, 256
Des Moines River basin, crest-stage partial-record stations in...................... 238, 239
  gaging-station records in.................. 137-175
Discharge, definition of..................... 49

Page

Discontinued stations, gaging................ 59
  water-quality.............................. 60
Dissolved, definition of..................... 49
Dissolved-solids, definition of.............. 49
Downstream order system...................... 27, 30
Drainage area, definition of................. 49
Drainage basin, definition of................ 50

East Branch Iowa River near Klemme........... 78
East Fork Des Moines River at Dakota City.... 139, 253
East Fork Hardin Creek near Churdan.......... 154, 254
East Fork One Hundred and Two River near Bedford........................... 223, 261
East Nishnabotna River, at Red Oak........... 211, 260
  near Atlantic.............................. 210, 260
Elk Creek near Decatur City.................. 224-226
English River at Kalona...................... 98, 250
English Creek nr Knoxville................... 171, 256
Example of site numbers for wells............ 31

Floyd River, at Alton........................ 184, 257
  at James................................... 186, 257
  West Branch, near Struble.................. 185, 257
Floyd River basin, crest-stage partial-record stations in...................... 240
  gaging-station records in.................. 184-186
Fourmile Creek (tributary to Des Moines River) at Des Moines........................ 164, 255
Fox River basin, crest-stage partial-record stations in...................... 239

Gage height (G.H.), definition of............ 50
Gaging station, definition of................ 50
Grand River Basin
  gaging-station records in.................. 224-228
Ground-water, by county, level data.......... 263-353
Ground-water, by county, quality data........ 354-392
Ground-water levels, records of.............. 43, 44
  data collection and computation............ 43
  data presentation.......................... 43, 44
Ground-water quality, records of............. 45, 46
  data presentation.......................... 45
  explanation of descriptive headings........ 46

Hardin Creek, East Fork, near Churdan........ 154, 254
Hardness, definition of...................... 50
Hydrologic bench-mark network, definition of. 50
Hydrologic conditions, summary of............ 3-25
  graphs of.................................. 8
  ground-water............................... 17-21
  ground-water-quality....................... 21-25
  precipitation and surface-water............ 3-7
  surface-water-quality...................... 12-16
  suspended-sediment......................... 7-12
Hydrologic unit, definition of............... 50

Indian Creek near Mingo...................... 126, 252
Introduction................................. 1
Iowa River, at Iowa City..................... 95, 250
  at Marengo................................. 91, 249
  at Marshalltown............................ 80-85
  at Wapello................................. 114-119
  East Branch, near Klemme................... 78
  near Lone Tree............................. 99, 250
  near Rowan................................. 79, 248
Iowa River basin, crest-stage partial-record stations in...................... 236, 237
  gaging-station records in.................. 78-119

Land-surface datum, definition of............ 50
Lake Panorama at Panora...................... 156
Lake Red Rock near Pella..................... 170
Lakes and Reservoirs:
  Black Hawk Lake at Lake View............... 152
  Clear Lake at Clear Lake................... 105
  Coralville Lake near Coralville............ 92
  Panorama, Lake, at Panora.................. 156
  Rathbun Lake near Rathbun.................. 231
  Red Rock, Lake, near Pella................. 170
  Saylorville Lake near Saylorville.......... 143
  West Okoboji Lake at Lakeside Laboratory near Milford................ 190

Page

- Latitude-longitude system... 30
- Little Cedar River near Ionia... 101, 250
- Little Maquoketa River basin, crest-stage partial-record stations in... 234
- Little Sioux River, at Correctionville... 193, 259
  - at Linn Grove... 192, 258
  - near Turin... 195, 259
- Little Sioux River basin, crest-stage partial-record stations in... 240
  - gaging-station records in... 190-195

- Map of Iowa, gaging stations... 28
  - active crest-stage gaging station... 29
  - water-quality stations... 11
  - ground water observation wells... 18
  - ground water quality... 24
- Maple River at Mapleton... 194, 259
- Maquoketa River near Maquoketa... 72, 248
- Maquoketa River basin, crest-stage partial-record stations in... 235
  - gaging-station records in... 71, 72
- McNay Research Station near Chariton, Precipitation Water-Quality, data for.. 393, 394
- Measuring point, definition of... 50
- Micrograms per gram (ug/g), definition of.... 50
- Micrograms per liter (UG/L,ug/L), definition of... 50
- Middle Raccoon River, at Panora... 157, 255
  - near Bayard... 155, 255
- Middle River near Indianola... 166, 255
- Milligrams per liter (MG/L,mg/l), definition of... 50
- Miscellaneous sites, special study and... 242-246
- Mississippi River Basin,
  - gaging stations in... 61-175
- Mississippi River, Main Stem...62-65, 73, 136
  - at Clinton... 73, 248
  - at Keokuk... 136
  - at McGregor... 62-65
- Missouri River Basin,
  - gaging stations in... 176-233
- Missouri River Main Stem...178-182, 187, 198-207, 216
- Missouri River, at Decatur, Nebraska... 187, 258
  - at Nebraska City, Nebraska... 203-207
  - at Omaha, Nebraska... 198-202
  - at Rulo, Nebraska... 216, 261
  - at Sioux City... 178-182
- Monona-Harrison ditch near Turin... 189, 258
- Monona-Harrison ditch basin, crest-stage partial-record stations in... 240
  - gaging-station records in... 188, 189
- Mosquito Creek basin, crest-stage partial-record stations in... 240

- National geodetic vertical datum (NGVD), definition of... 51
- National stream-quality accounting network, (NASQAN) definition of... 51
- National trends network, definition of... 51
  - data presentation... 393-396
- Nishnabotna River above Hamburg... 212-214
- Nishnabotna River basin, crest-stage partial-record stations in... 240, 241
  - gaging-station records in... 208-214
- Nodaway River at Clarinda... 217-221
- Nodaway River basin, crest-stage partial-record stations in... 241
  - gaging-station records in... 217-221
- North Fork Maquoketa River at Fulton... 71, 247
- North Raccoon River, near Jefferson... 153, 254
  - near Newell... 149, 254
  - near Sac City... 151, 254
- North River near Norwalk... 165, 255
- North Skunk River near Sigourney... 128, 253
- Numbering system for wells... 31

- Ocheyedan River near Spencer... 191, 258
- Old Mans Creek near Iowa City... 97, 250
- One Hundred and Two River, East Fork, near Bedford... 223, 261

- Parameter code, definition of... 51
- Partial-record station, definition of... 51
- Partial-record station and miscellaneous discharges at... 234-241

Page

- Particle size, definition of... 51
- Particle size classification, defintion of... 51, 52
- Perry Creek at 38th Street, Sioux City... 183, 257
- Perry Creek basin, crest-stage partial-record stations in... 239
  - gaging-station records in... 183
- Pesticides, definition of... 52
- Picocurie (PC,pCi), definition of... 52
- Platte River near Diagonal... 222, 261
- Platte River basin, crest-stage partial-record stations in... 241
  - gaging-station records in... 222, 233
- Precipitation water-quality data... 393-396
- Publications on techniques of water-resources investigations... 57,58

- Radiochemical program, definition of... 52
- Raccoon River at Van Meter... 159-161
- South Branch, at Iowa City... 96
- Rapid Creek near Iowa City... 93
- Rathbun Lake near Rathbun... 231
- Records, explanation of... 27-46
- Recoverable from bottom material, definition of... 52
- Reservoirs (See lakes and reservoirs)
- Return period, definition of... 52
- Richland Creek near Haven... 87, 249
- Roberts Creek basin, discharge measurements in... 242-244
- Roberts Creek above Saint Olaf... 69, 247
- Rock River near Rock Valley... 176, 257
- Runoff, in inches, definition of... 52

- Salt Creek near Elberon... 88, 249
- Saylorville Lake near Saylorville... 143
- Sediment, definition of... 52, 53
- 7-day, 10-year low flow (7 Q), definition of. 53
- Shell Rock River at Shell Rock... 106, 251
- Silver Creek near Luana... 67, 247
- Skunk River at Augusta... 130-135
- Skunk River basin, crest-stage partial-record stations in... 238
  - gaging-station records in... 120-135
- Sodium adsorption ratio, definition of... 53
- Soldier River at Pisgah... 196, 259
- Soldier River basin, crest-stage partial-record stations in... 240
  - gaging-station records in... 196
- Solute, definition of... 53
- South Branch Ralston Creek at Iowa City... 96
- South Fork Chariton River near Promise City.. 230, 262
- South Raccoon River at Redfield... 158, 255
- South River near Ackworth... 167, 256
- South Skunk River, near Ames... 120, 252
  - at Colfax... 122-125
  - near Oskaloosa... 127, 252
- Special networks and programs... 26
  - Hydrologic Benchmark Network... 26
  - National Stream Quality Accounting Network 26
  - National Trends Network... 26
  - Radiochemical Program... 26
  - Tritium Network... 26
- Special Study and Miscellaneous Sites... 242-246
- Specific conductance, definition of... 54
- Squaw Creek at Ames... 121, 252
- Stage-discharge relation, definition of... 54
- Stage and water-discharge, records of... 32-37
  - accuracy of the records... 36, 37
  - data collection and computation... 32, 33
  - data presentation... 34-36
  - identifying estimated daily discharge... 36
  - other records available... 37
- Station identification numbers... 27-30
- Streamflow, definition of... 54
- Surface area, definition of... 54
- Surface water quality, records of... 37-42
  - arrangement of records... 38
  - classification of records... 37, 38
  - data presentation... 40, 41
  - laboratory measurements... 40
  - on site measurements and sample collection 38
  - remark codes... 42
  - sediment... 39, 40
  - water temperature and specific conductance 39

Page
Surficial bed material, definition of........ 54
Suspended, definition of...................... 54
Suspended recoverable, definition of......... 54
Suspended total, definition of............... 55

Tarkio River at Stanton...................... 215, 260
Tarkio River basin, crest-stage partial-
    record stations in...................... 241
  gaging-station records in................. 215
Terms, definition of......................... 48-56
Thermograph, definition of................... 55
Thompson River at Davis City................. 227, 261
Timber Creek near Marshalltown............... 86, 249
Time-weighted average, definition of......... 55
Tons per acre-foot, definition of............ 55
Tons per day, definition of.................. 55
Total, definition of......................... 55
Total discharge, definition of............... 55
Total recoverable, definition of............. 56
Tritium network, definition of............... 56
Turkey River, at Garber...................... 70, 247
  at Spillville.............................. 66, 247
Turkey River basin, crest-stage partial-
    record stations in...................... 234
  gaging-station records in................. 66-70

Unnamed Creek near Luana..................... 68, 247
Upper Iowa River, near Dorchester............ 61, 247
Upper Iowa River basin, crest-stage
    partial-record stations in............. 234
  gaging-station records in................. 61

Walnut Creek at Des Moines................... 162, 255
Walnut Creek near Hartwick................... 89
Wapsipinicon River, at Independence.......... 75, 248
  near De Witt............................... 76, 248
  near Elma.................................. 74, 248
Wapsipinicon River basin, crest-stage
    partial records in...................... 235
  gaging-station records in................. 74-76
Water-quality, miscellaneous analyses........ 247-262
Water-data report (WDR), definition of....... 56
Water-supply papers (WSP), definition of..... 56
WATSTORE data, access to..................... 47
Water year, definition of.................... 56
Weighted average, definition of.............. 56
Weldon River near Leon....................... 228, 261
Wells, ground water, levels and quality
   of water data, by county:
      Adair County...................... 354-356
      Audubon County..................263, 264, 354-356
      Benton County..................... 265-268
      Black Hawk County................. 354-356
      Bremer County..................... 354-356
      Buchanan County................... 354-359
      Buena Vista County..............268, 269, 357-359
      Butler County..................... 357-359
      Calhoun County.................... 357-359
      Carroll County..................270-272, 357-359
      Cass County..................... 272, 357-359
      Cerro Gordo County................ 273, 274
      Cherokee County.................275-277, 357-359
      Chickasaw County.................. 357-362
      Clay County....................... 360-362
      Clayton County..................278, 279, 360-362
      Clinton County.................... 360-362
      Crawford County.................280-283, 360-365
      Dallas County..................... 363-365
      Delaware County................. 283, 363-365
      Des Moines County............... 284, 363-365
      Dubuque County.................... 363-365
      Emmett County..................... 285
      Fayette County.................... 363-365
      Floyd County...................... 363-365
      Franklin County................... 363-365
      Fremont County.................... 366-368
      Greene County...................285-290, 366-368
      Grundy County................... 290, 366-368
      Guthrie County..................291-295, 366-368
      Hancock County.................... 366-368
      Hardin County..................... 366-368
      Harrison County.................295-303, 366-368
      Henry County...................... 303, 304
      Howard County..................... 366-371
      Humboldt County................. 305, 369-371
      Ida County......................305, 306, 369-371
      Iowa County.....................306-308, 369-371
      Jackson County..................308, 309, 372-374
      Jasper County................... 310, 372-377
      Johnson County.................... 311-316
      Jones County.................... 316, 372-374
      Keokuk County..................... 372-374
      Kossuth County.................... 372-377
      Lee County........................ 317
      Linn County.....................317-326, 375-377
      Louisa County..................... 375-377
      Lyon County.....................326-328, 375-377
      Madison County.................... 328
      Marion County...................329,330, 375-377
      Marshall County................. 330, 375-377
      Mitchell County................... 378-380
      Monona County...................331-334, 378-380
      Montgomery County................. 335
      Muscatine County.................. 335
      O'Brien County..................336, 337, 378-380
      Osceola County..................337-339, 381-383
      Page County....................... 339
      Palo Alto......................... 381-383
      Plymouth County................. 340, 381-383
      Polk County....................... 381-383
      Pottawattamie County.............. 341, 342
      Poweshiek County.................. 384-386
      Sac County...................... 342, 384-386
      Scott County.................... 343, 384-386
      Shelby County...................344-346, 384-386
      Sioux County.................... 347, 384-389
      Story County...................... 347
      Tama County....................... 387-389
      Taylor County..................... 387-389
      Van Buren County.................. 387-389
      Warren County..................... 387-389
      Washington County...............348-350, 387-389
      Webster County..................350, 351, 390-392
      Winnebago......................... 390-392
      Woodbury County.................352, 353, 390-392
      Wright County..................... 390-392
West Branch Floyd River near Struble.......... 185, 257
West Fork Cedar River at Finchford............ 103, 251
West Fork ditch at Hornick.................... 188, 258
West Nishnabotna River, at Hancock............ 208, 259
  at Randolph................................. 209, 260
West Okoboji Lake at Lakeside
  Laboratory near Milford..................... 190
Wexford Creek basin, crest-stage
    partial-record stations in............... 234
White Breast Creek near Dallas................ 169, 226
Winnebago River at Mason City................. 104, 251
WSP, definition of 56

October 1, 1978

FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI).

Multiply inch-pound units	By	To obtain SI units
	Length	
inches (in)	$2.54\text{x}10^{1}$	millimeters (mm)
	$2.54\text{x}10^{-2}$	meters (m)
feet (ft)	$3.048\text{x}10^{-1}$	meters (m)
miles (mi)	$1.609\text{x}10^{0}$	kilometers (km)
	Area	
acres	$4.047\text{x}10^{3}$	square meters (m^2)
	$4.047\text{x}10^{-1}$	square hectometers (hm^2)
	$4.047\text{x}10^{-3}$	square kilometers (km^2)
square miles (mi^2)	$2.590\text{x}10^{0}$	square kilometers (km^2)
	Volume	
gallons (gal)	$3.785\text{x}10^{0}$	liters (L)
	$3.785\text{x}10^{0}$	cubic decimeters (dm^3)
	$3.785\text{x}10^{-3}$	cubic meters (m^3)
million gallons	$3.785\text{x}10^{3}$	cubic meters (m^3)
	$3.785\text{x}10^{-3}$	cubic hectometers (hm^3)
cubic feet (ft^3)	$2.832\text{x}10^{1}$	cubic decimeters (dm^3)
	$2.832\text{x}10^{-2}$	cubic meters (m^3)
cfs-days	$2.447\text{x}10^{3}$	cubic meters (m^3)
	$2.447\text{x}10^{-3}$	cubic hectometers (hm^3)
acre-feet (acre-ft)	$1.233\text{x}10^{3}$	cubic meters (m^3)
	$1.233\text{x}10^{-3}$	cubic hectometers (hm^3)
	$1.233\text{x}10^{-6}$	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	$2.832\text{x}10^{1}$	liters per second (L/s)
	$2.832\text{x}10^{1}$	cubic decimeters per second (dm^3/s)
	$2.832\text{x}10^{-2}$	cubic meters per second (m^3/s)
gallons per minute (gal/min)	$6.309\text{x}10^{-2}$	liters per second (L/s)
	$6.309\text{x}10^{-2}$	cubic decimeters per second (dm^3/s)
	$6.309\text{x}10^{-5}$	cubic meters per second (m^3/s)
million gallons per day	$4.381\text{x}10^{1}$	cubic decimeters per second (dm^3/s)
	$4.381\text{x}10^{-2}$	cubic meters per second (m^3/s)
	Mass	
tons (short)	$9.072\text{x}10^{-1}$	megagrams (Mg) or metric tons

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